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## LENSES FOR SUBNORMAL VISION

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A study of 200 persons with low vision shows that a substantial number can be partially rehabilitated with subnormal vision aids.\*

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**T**WO hundred patients were examined for subnormal vision lenses at The Lighthouse (The New York Association for the Blind). Lenses were prescribed for 100, all of whom were later interviewed to decide whether or not the lenses were beneficial. The examiner concluded that 65 patients were rehabilitated to an acceptable degree.

The results of this project showed two significant things:

1. A correction for lenses seemed to make a worthwhile improvement in 50 per cent of the patients examined.
2. Of those for whom lenses were prescribed, 65 per cent were judged to be successful by the standards of both the examiner and the patient.

The criteria for success or failure depended upon an interview with the patient after he had worn his correction for two months. This interval seemed advisable in order to avoid the influence of initial enthusiasm. The decision of success or failure depended on the answers to the following questions:

\* Presented at the Annual Conference of the National Society for the Prevention of Blindness, New York, N. Y., March 16, 1955.

1. How long have you had your present glasses?
2. For what purposes do you use them?
3. How often do you use them?
4. How long do you use them at one time?

Some decisions were made with ease. In some cases where a decision was difficult the patient was interviewed again at a later date.

### Types of Pathology

The types of ocular pathology chiefly responsible for the subnormal vision in those cases in which lenses were prescribed are indicated in Table I.

This classification as presented is greatly over-simplified because many patients presented themselves with multiple pathology, e.g., corneal opacities, cataracts and glaucoma. In fact, the ocular pathology is more often multiple.

Some types of pathology impressed the examiner as offering a more favorable prognosis than others. Albinism, post-operative aphakia, macular degeneration, myopic degeneration and corneal opacities seem to be the most promising; whereas diabetic retinopathy, retinitis pigmentosa and glaucoma are the least promising. While the per cent of successes is not

TABLE I

Types, Incidence of Ocular Pathology Causing Subnormal Vision

Ocular Pathology	Number	Number Successful	Percentage Successful
Optic atrophy.....	16	9	56
Glaucoma.....	14	7	50
Corneal opacities.....	13	9	69
Albinism.....	9	8	89
Cataracts.....	9	6	67
Post-operative aphakia for congenital cataracts.....	7	6	86
Macular degeneration.....	6	5	83
Myopic degeneration.....	6	5	83
Chorioretinitis.....	6	4	67
Retinitis pigmentosa.....	5	1	20
Miscellaneous.....	5	4	
Diabetic retinopathy.....	2	0	
Keratoconus.....	2	1	50

too significant in so few cases, an indication for pathology favorable for correction is made. The fact that albinos are promising patients and that those with retinitis pigmentosa and glaucoma are least promising is supported by my experience other than that at The Lighthouse.

Figure I demonstrates non-optical magnification for distant and near vision. Using the abscissa expressed in feet one can readily interpret the magnification produced by moving up to the object of regard. This explains

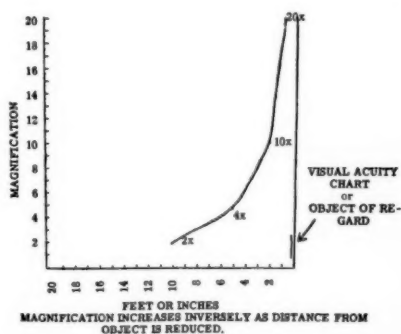


FIGURE I

the fact that patients with 5/200 vision enjoy television by sitting two feet from the screen, which gives them 10x magnification.

Applying the abscissa expressed in inches, this diagram shows the magnification gained by bringing the reading matter close to the eyes. This explains the fact that young phakic patients and myopic patients can read textbooks at distances from three to four inches from their eyes when their distant vision is 20/200 or less.

The diagram also demonstrates the magnification produced by strong plus lenses because these lenses enable the patient to read print at close range, therefore producing greater magnification. Print that subtends an overall visual angle of 5 minutes at 20 inches (considered normal vision when read at 20 inches) is magnified 10x when read at 2 inches. This can be accomplished by an adult wearing a +40.00 diopter sphere.

The types of lenses prescribed were classified as regular, simple magnifying, doublet magnifying, and contact,

as shown in Table II. The vision of 22 patients was improved by regular lens correction: e.g., an albino who was wearing no glasses was greatly benefited by the following correction: O.D.  $-8.50$  sph =  $+1.00$  ax 90, O.S.  $-11.00$  sph. =  $+1.75$  ax 90. There were a few aphakic patients examined who had been wearing no correction, consequently they appreciated the usual strong plus correction. These were a group of patients who required only a thorough refraction.

Fifty-four patients were given prescriptions for simple magnifying lenses. These can be considered simple microscopic lenses. These corrections ranged from  $+8.00$  diopter sphere to  $+30.00$  diopter sphere. Many of the strong plus corrections were given in the form of bifocals when the distant correction improved the distant vision. Bifocals with  $+8.00$  diopter additions were commonly prescribed. The highest reading addition in a bifocal was a  $+12.00$  and this was a notable success.

Half-eye magnifying glasses proved most useful for patients requiring no significant distant correction.

Doublet magnifiers, also known as microscopic type or clear image lenses, were prescribed for 19 patients. The powers ranged from 8x magnification to 20x magnification. The high percentage of favorable results was impressive with 8x and 12x magnification.

Contact lenses were fitted to five patients. They were prescribed by Dr. Allan Rossby of New York City who has been actively engaged in this field for the past 12 years.

No telescopic lenses were prescribed in this series of cases, a fact that may be as startling to the reader as it was to the examiner. A greater demand for them had been anticipated due to the prevalence of television. The majority of patients with subnormal vision enjoyed television and could look at it for hours by sitting at distances from one to three feet from the screen. Those who owned telescopic lenses preferred to sit closer to the screen and not wear the lenses. The examiner believed there were no patients in this group whose near vision would be benefited more by telescopic lenses than by a simple magnifying lens. However, one patient, a shoemaker, was examined who was wearing telescopic lenses at his work. In such a case no other magnifying device would supplant the telescopic lenses because a maximum working distance is essential for this trade. In four patients telescopic spectacles were replaced by bifocals with strong reading additions or strong plus lenses. These lenses were found preferable to the telescopic lenses by all four patients as evidenced by the fact that the telescopic spectacles were no longer worn.

It is instructive to note that regular

TABLE II

Type of Lenses	Number Prescribed	Number Successful	Percentage Successful
Regular . . . . .	22	12	55
Magnification . . . . .	54	35	65
Doublet . . . . .	19	14	74
Contact . . . . .	5	4	80
Telescopic . . . . .	0		



TABLE III

Range of Visual Acuity	Number	Number Successfully Corrected	Percentage Successfully Corrected
1/200.....	1		
3/200-10/200.....	40	29	73
11/200-20/200.....	26	18	69
20/180-20/100.....	24	14	58
20/80 -20/50.....	7	3	43
20/40 -20/20.....	2	1	50

lenses and simple magnifying lenses were prescribed in 76 per cent of cases.

#### Degree of Visual Defect

Table III records the degree of visual defect encountered in this project as well as the number in each group and the incidence of successful cases. It shows that 67 per cent of the patients having subnormal vision seeking correction have a visual acuity of 20/200 and less. Seventy-two per cent of this group were successfully corrected. The two patients whose vision ranged between 20/40 and 20/20 suffered from advanced chronic simple glaucoma with markedly constricted visual fields.

#### SUMMARY AND CONCLUSIONS

1. Of 200 patients with subnormal vision the examiner believed that 100 could be partially rehabilitated with subnormal vision lenses.
2. Of the 100 cases in which lenses were prescribed, 65 were considered to be successful by the patient and the examiner.
3. Relative frequency of ocular pathology responsible for subnormal vision is enumerated.
4. Types of lenses prescribed, the number of each kind and percentage of successful results are tabulated.
5. Degree of visual defect, incidence and percentage of successfully corrected cases are tabulated.

6. Seventy-six per cent of subnormal vision cases can be corrected by a careful refraction or by the use of strong plus lenses.

7. There seems to be small need for telescopic spectacles, especially for distant use.

8. Four patients who had been wearing telescopic lenses for reading were fitted with bifocals with strong reading additions or strong plus lenses which they found preferable to telescopic lenses.

9. Seventy-four per cent of doublet magnifiers were successful.

10. Eighty per cent of contact lenses were successful.

\* \* \*

Mr. Conrad Carlsen of Haustetter & Company dispensed the lenses used in this project.

Miss Ann Marcus performed various services in many capacities for the efficient operation of the Low Vision Service at The Lighthouse.

#### FACTS ABOUT EYE EXERCISES

"Do Eye Exercises Improve Myopia, Glaucoma or Color Blindness?" That is the title of a four-page pamphlet recently published by NSPB (price 5 cents). Scientific studies have shown no basis for extravagant claims of "cures" achieved by means of eye exercises. Facts given in this pamphlet help to guide persons seeking proper treatment for eye defects and diseases.

# Assessment and First Aid Treatment of Eye Injuries

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Injuries to the delicate structure of the eye require prompt and expert attention. The author clearly outlines definite procedures for handling the three major types of injury.\*

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THE problems facing the industrial surgeon who is not an ophthalmologist are properly to assess the seriousness of an injury, to decide what first aid should be administered, and what cases should be referred immediately to a specialist. We may divide injuries into mechanical, chemical and thermal, and briefly discuss the first aid treatment which should be administered, and the complications to be looked for in each.

## MECHANICAL TRAUMA

Contusions and lacerations around the eyes involve areas richly supplied with blood vessels and covered with thin, delicate skin which is easily torn and subject to massive swelling from blood or edema fluid. The adequacy of the first aid treatment frequently determines the final cosmetic result, which is obviously of great importance to the patient. Bleeding must be stopped before anything else is done. Since a tourniquet cannot be applied this must be done either by compression and hot packs, or if large arteries are torn by picking them up with hemostats and ligating them.

If the patient also has other bodily injuries such as one frequently sees in

automobile accidents, where the face injuries are only a small part of the total trauma, the damage to the lids and eyeball may have to wait. Sterile dressings should be applied, and if the eyeball is exposed because the lids are badly torn it should be covered by vaseline or some sterile ointment. If the damage to the lids and globe can be treated immediately the wounds should be thoroughly irrigated with sterile saline and as much foreign material removed as possible.

All tags of skin should be carefully saved. Because of the rich blood supply it is remarkable how frequently tissue, which in other localities would have to be sacrificed, can be sewn together later on and saved. Debridement is usually unnecessary because of the excellent tissue nutrition and only that tissue which is absolutely devitalized should be sacrificed. The closure of such lacerations should be left to those experienced in this field, and especially to those who possess the instruments suitable for the purpose. There is no necessity to make immediate repair of such lacerations of the

\* One of a series of lectures on Occupational Health delivered at the University of Pennsylvania Medical School.

skin of the lids, and only those thoroughly familiar with the anatomy of the parts should be entrusted to do the job, even though it takes two or three days to secure such help. In the meantime the patient should be given parenteral antibiotics and tetanus antitoxin or toxoid.

#### **Estimating the Damage**

Assessment of damage to the eyeball itself should be made as soon as possible. A rough estimate of the patient's visual acuity of each eye is desirable as soon after an injury as possible. Subconjunctival hemorrhage, although alarming to look at, is usually of no moment. Occasionally, however, it covers the site of a rupture of the globe. This is usually associated with immediate loss or severe diminution of vision due to intraocular hemorrhage, and can usually be suspected by digital palpation of the globe through the closed lids. If the globe is ruptured the eye is mushy soft to palpation.

Foreign bodies on the cornea or the lids, lacerations of the cornea, and the presence of prolapse of the iris should be looked for. If anything abnormal, save for the presence of conjunctival or corneal foreign bodies, is found, it is best to patch the eye and call for help. If the eyeball seems normal but the damage to the lids is severe it is best to have the patient seen by an ophthalmologist for final evaluation. Contusions to the globe frequently result in damage which is not easily detected by the uninitiated, but which can be the cause of eventual loss of the eye. Dislocation of the lens, traumatic cataract, detachment of the retina, commotio retina resulting in a permanent loss of central vision, tears in the choroid, and secondary glaucoma are a

few of the complications which may arise as a result of blunt force to the globe. Serious medicolegal complications can arise from failure to detect and treat such damage properly.

#### **Immobilize Injured Eye**

If any damage is found to be present in an eye the injured eye should be immobilized immediately to prevent herniation of the ocular contents in the case of lacerations, or of hemorrhage into the interior of the eye. This is best accomplished by patching both eyes and moving the patient by litter. At least movement and straining should be kept at a minimum. If the eye is lacerated and looks as though it contains foreign material it is best to leave this to the experienced ophthalmologist to remove, since iris tissue may closely resemble a blood clot, and iris pigment a foreign body, and attempt at removal might cause irreparable damage.

Any manipulation of a recently injured eye will cause great pain with squeezing of the lids and further damage to the globe. The ophthalmologist will employ facial akinesia together with proper anesthesia, and will have the proper lights and instruments, as well as the experience, in order to conduct a proper examination and treatment. If it is not possible to secure an ophthalmologist for 24 hours a drop of atropine should be put in the eye and chemotherapy instituted as soon as possible. We prefer a combination of penicillin and streptomycin.

#### **Importance of X-Ray**

In every case in which the globe has been lacerated, i.e., penetrated, an intraocular foreign body must be suspected. Every such eye must be

x-rayed. Failure to do so constitutes malpractice. I have seen several eyes in which no intraocular foreign body was suspected and no x-ray taken until the gradual loss of vision brought the patient in. Siderosis of the iris (pigmentation due to the deposition of iron) prompted a careful search for the scar of a penetration wound, and a tiny corneal penetration was found. Later x-ray revealed a piece of iron which was subsequently removed by magnet extraction, but the eye was lost as a result of the siderosis. The physicians who took care of these cases could and should have been sued.

Large foreign bodies may become imbedded in the orbit following perforating injuries to the lids. Bullets, sticks, pieces of lead from a pencil have been overlooked by not x-raying the orbit. Glass is especially difficult to find by x-ray and special technique may have to be employed.

#### **Foreign Body on Cornea**

Foreign bodies on the cornea can usually be properly handled by the plant physician. The vision of every eye should be tested before a foreign body is removed, and before final discharge of the patient. Removal should be done under pontocaine anesthesia, with as little trauma as possible. If a rust ring is present it is best to refer the patient to an ophthalmologist. In the majority of cases waiting until the sequestrum containing the rust forms and loosens itself is preferable to trying to curette the rust. Antibiotics should be used locally, and the pupil dilated with atropine if there is obvious ciliary flush. The patient must be seen every day until cured. If there is any sign of failure of the epithelium to heal over, as tested with fluorescein, or

of beginning infection, the patient should be referred immediately. Patching of the eye is optional and even debated by different experts.

#### **Sympathetic Ophthalmia**

Sympathetic ophthalmia is a rare occurrence. Even so, any eye which has had a penetrating injury and which does not show signs of healing and subsidence of inflammation after two weeks of treatment should be considered a possible candidate for this dread disease. Wounds of the ciliary body are especially predisposed. It can be assumed that before this the patient would have been referred for help from any industrial plant and the problem left to the ophthalmologist.

#### **CHEMICAL INJURIES**

Regardless of the type of chemical the eye should be immediately flushed out with water. This should be present in every room in which an individual is working with chemicals. Never delay such irrigation, and never spend time looking for the sterile buffered solution which was placed somewhere in the medicine cabinet just for this specific purpose. Water is as good as any solution, and better if it can be got to the eye quicker. Speed of removal is what counts, and every second is precious. If the victim has fallen to the floor, water should be dashed into his face and the lids forcibly opened while more water is poured in. Later he may be put in a better position for thoroughly irrigating the cul-de-sac. If by any chance no water is anywhere around the best substitute is the most available innocuous liquid. In the army, if an eye was burned with mustard and no water was available the soldier was instructed to use

urine, if by that time any was still left.

The employees in every plant should be instructed in the use of water in chemical injuries of the eyes, and by the time the nurse or physician arrives on the scene the eyes should have been thoroughly irrigated by the patient's fellow workmen.

#### **Treatment in Dispensary**

Following irrigation one or two drops of one per cent pontocaine or ophthaine should be instilled, and as soon as pain and blepharospasm permit, a drop of two per cent fluorescein put in the eye, followed by more irrigations with saline. The eye should then be inspected for gross particles of foreign matter, and these removed by irrigation or with a cotton-covered applicator moistened with saline. The upper lid should be everted and a search for gross particles made. If the conjunctiva or cornea stains the patient should be referred to an ophthalmologist. This is particularly true if the chemical is an alkali.

It is a general rule that acid burns always look worse at the start than they turn out to be, while alkali burns never look quite as serious as they are. The reason for this is simple. An acid coagulates the surface tissues as it splashes into the eye, forming a hard white eschar which prevents further penetration of the acid into the tissues. An alkali, on the other hand, softens the tissues it reaches and continues to penetrate until it is all washed out or neutralized. Every alkali burn is a serious affair, and even though the injury looks trivial at the start, if the tissues stain the patient should be treated with great care and preferably hospitalized. It is common experience to see what look like minor burns from

lime each day increase in staining area, and more cornea take on a glazed or greasy appearance; until finally the tissue becomes necrotic, all chance of saving useful vision disappears, and a badly scarred cornea with symblepharon (adhesions of the palpebral conjunctiva to the globe) is the final outcome.

The amount of irrigation in the dispensary is important. If the eye stains at all the irrigations in the first aid dispensary should be continued for fifteen minutes and the stain reapplied and flushed out. If the eye still stains, irrigations should be kept up by the nurse or physician for another fifteen minutes. In this way as much of the chemical as possible is both washed out and neutralized. All chemical burns are emergencies and should be seen by an experienced ophthalmologist immediately, day or night. Many ophthalmologists prefer to denude the epithelium following chemical burns in order to get rid of tissue which is both devitalized and contains absorbed chemical. The eyes should be patched with antibiotics and the patient hospitalized.

#### **Buffer Solution**

Specific neutralizing solutions may have some value, especially after exposure to calcium hydroxide—lime. The following weak acid buffer solution is well tolerated by the eye:

Glacial acetic acid; 2.9 cc. (0.05 M.)  
Sodium acetate trihydrate; 6.8  
Grams (0.05 M.)  
Distilled water; q.s. 1,000 cc.

This may be instilled every 30 seconds for five minutes, every 15 minutes for two hours, and then every hour or two for the next 24 hours. Acid burns

can be treated by the instillation of 1.5 per cent sodium bicarbonate solution, an isotonic solution well tolerated by the eye. Hydrosulphosol has not been found to be more beneficial than other forms of treatment in control of experiments in animals, or in clinical results as reported by McLaughlin (*Amer. Jour. of Oph.* 35:21, 1952). The use of cortisone may be helpful in blocking inflammation.

#### THERMAL BURNS

Burns of the face are particularly serious because of the danger to eyesight and because of the marked cosmetic result produced. We classify them into three degrees: the first degree being simple erythema, the second degree partial destruction of the skin without destruction of all the epithelial cells. These are characterized by bleb formation. The third degree shows destruction of the full thickness of the skin. These burns are usually characterized by a dry, hard, dead white, firm, leathery or charred skin.

After general treatment, and morphine or codeine for pain, petrolatum on fine mesh gauze should be applied, and over this initial layer a bulky layer of fluffed gauze, followed by a firm wide bandage to give gentle compression. Stockinet over the head, with openings for the nose, mouth and undamaged eye may be used. The dressing may be left for seven to 10 days without being disturbed, especially if the patient's temperature is normal, the patient meanwhile being kept on antibiotics parenterally.

The question of split thickness grafts in second degree burns and full thickness grafts in third degree burns is

outside the field of emergency treatment. Nearly all burns of the face involving the lids result in cicatricial ectropion, with exposure of the cornea, and this requires plastic surgery. Burns of the conjunctiva may require mucous membrane grafting. If the eyeball is burned it is best to apply a vaseline dressing and get expert help.

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#### MICHIGAN PROGRAM

Vision consultants of the Michigan State Health Department helped plan new programs and further develop existing programs in 67 counties during 1954, according to *Michigan's Health*. In 35 counties where the Massachusetts Vision Test was used, 142,830 children were screened. Of these children 22 per cent were found to have eye difficulties.

The State Register of Severely Visually Handicapped Children was established in 1954 and now includes the names of 538 children.



# OPHTHALMOLOGY IN RURAL AREAS

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Ophthalmology in rural areas has much higher standards today than was the case only a few decades ago. Expansion in public health measures together with better training within the ophthalmic professions has contributed to a marked reduction in the incidence of blindness.\*

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A FEW months ago the chief of an eye department in an eastern teaching hospital was asked to recommend one of his residents for a rural eye practice. He quickly replied that most of his residents preferred the city with its large hospitals, its scientific associations, its facilities for research and consultation and the organized teamwork of its operating rooms. The same chief pointed out that a number of his pupils had gone to small towns and, lacking the stimulus of large centers, had returned to the metropolitan area.

This attitude is slowly changing, because the tremendous need for ophthalmic service in rural areas is being more and more recognized. Metropolitan areas had proper facilities for many decades and expert advice was readily available privately or, for the indigent, in public institutions. Rural areas were less fortunate in this respect and frequently lacked ophthalmologists who had formal training which could be regarded as adequate. The colleagues in smaller towns some-

times had only a post-graduate course of a few months' duration or acquired the title "specialist" by a six months' journey to Europe. These were excellent means to round out an education but by themselves were not sufficient to make for a safe ophthalmologist.

## Neglect of Eye Problems

The non-medical refractionist of those olden days likewise had had only a few weeks or months of formal education, sometimes for no other reason than to open the way for a profitable commercial enterprise. The medical profession had no desire to cooperate with these men or even to recognize professional aspects of optometry. On the other hand, there was little that the general practitioner of medicine remembered from his short lectures in medical school about the diseases of the eye. He simply was not interested in them. Public health measures for the prevention of blindness were in their infancy and ocular public health agencies frequently did not find the cooperation of local physicians in private practice, even though these public endeavors did concern themselves with eye problems which could not be solved by private practitioners alone.

\* Presented before the Section on Eye, Ear, Nose and Throat, 113th Annual Meeting, Illinois State Medical Society, Chicago, May 19, 1953, and reprinted from the *Illinois Medical Journal*, February 1954.

It was the result of these conditions in rural ophthalmic care that blind pension examinations in rural areas during the past ten years turned up many cases in which proper care would undoubtedly have saved or preserved vision. The over-ripe cataract with glaucoma, the unrecognized detachment, the adult with strabismus fixus, the overgrown pterygium, the occluded pupil after uveitis, the dense pannus of far advanced trachoma, the absolute glaucoma who never had seen a tonometer, never had a field, or heard of the possibility of surgery when drops failed to control tension—all these are instances of showing up the need for good responsible eye care.

#### **Recent Progress**

During the past two decades considerable progress has been made in the fulfillment of this need.

In the public health field, spearheaded by the untiring efforts of the Illinois Society for the Prevention of Blindness, gonorrheal ophthalmia of the newborn and trachoma have been virtually wiped out. The former subsided in consequence of the mandatory silver nitrate law, passed in 1933; the latter has decreased to a near vanishing point as a result of the establishment of special treatment centers in combination with the advent of sulfa drugs and antibiotics and generally improved living conditions. Not counting the savings in human suffering alone, the saving in blind pension funds far outweighs the public cost of the initial expense.

Regular, systematic testing of school children by means of the Massachusetts vision test is discovering many young people with defective sight or muscle imbalances who otherwise

would not receive attention until much later in life. This program again is under the sponsorship of the Illinois Society for the Prevention of Blindness, makes extensive use of public health nurses and lay personnel, and is supervised by joint committees of oculists and optometrists on the local or regional level. Sight-saving classes have been established in many of the larger communities to aid pupils with subnormal vision or high myopia. In districts where this is not feasible, due to lack of sufficient numbers of such pupils or other reasons, the books which are used in sight-saving rooms and which have special large print are usually made available whenever the oculist requests them.

#### **Responsibility of General Practitioner**

The general practitioner plays a most important part in the eye care of the rural population, because on his judgment and treatment rely many cases which in the city automatically come to the attention of the ophthalmologist. In addition, many people would never seek special eye care, did not the simple visual acuity test during the course of a general physical examination uncover an eye defect. The alert family physician becomes, therefore, a sort of detecting station for impending or established ocular trouble. It is also necessary that he have some knowledge of the facilities available to modern ophthalmic care, in order that he may be able to correct such mistaken ideas as that "a cataract has to ripen before surgery" or "a child will grow out of crossed eyes." The close contact the rural general physician usually has with the families in his area gives him a splendid opportunity to point out steps for ocular



care and attention which would otherwise be neglected.

While interest in ophthalmological problems may vary with each practitioner, a check of visual acuity should be a standard routine procedure and cases seeing less than 20/30 should be referred. Ophthalmoscopy is not difficult and should also be part of a routine check-up. The recognition of a choked disc may save a life long before an oculist is finally consulted for unexplained headaches, and hemorrhages or exudates in the retina may be a finding which aids in evaluating vascular or metabolic disease. Every rural general physician should acquire the training and knowledge as to how to handle a spud for corneal foreign body and should be able to do it competently in a sterile manner. The danger of perforating the cornea is small but neglect or unsterile procedures may, on the other hand, be disastrous.

#### **Role of Optometrist**

The optometric profession plays a significant part in rural eye care and prevention of blindness. The usual reaction of the layman to the symptom of declining sight is one of "I have to have my glasses changed." In 75 out of 100 cases this thought will lead the patient to an optometrist. It readily becomes evident that a tremendous responsibility rests on any refractonist who becomes the examiner of this patient. Quite certainly the average layman in rural areas does not differentiate between optometrist and oculist. Both fall to him under the heading "eye doctor." While declining sight may mean merely a need for change in glasses it may also mean cataract, glaucoma, retinal disease, brain tumor and a host of other pathological enti-

ties. Again, the rule that every patient who sees less than 20/30 should be seen by an oculist is to be recommended. Most children should also have an oculist consultation for the purpose of examination under cycloplegia.

Educational requirements for obtaining license as optometrist have been constantly raised, and a good many of the younger men coming out of optometric colleges nowadays have received good training. It is in the public interest that the ophthalmologist in the area cooperate with these men and that he join them in their efforts to stamp out commercialism in the field of ophthalmic care, not only by educating the public but by convincing our legislators that the sight of our citizens cannot be entrusted to people who are solely interested in it from the commercial standpoint.

#### **Problems of Rural Practice**

For the ophthalmologist himself rural or small town practice presents certain problems which do not necessarily exist in city practice. As there is usually no opportunity for help or consultation from other local oculists—he is alone in a wide area—it is a basic requirement that his ophthalmological training be thorough enough to make him a dependable diagnostician, familiar with all the common methods of treatment available to ocular science and at least acquainted with all the rarer ones. It is desirable that he do reliable surgery. Nobody pays much attention in rural areas as to whether an oculist is certified, but in the absence of any other criteria by which he could evaluate his professional adequacy the passing of the board becomes a matter of his own re-

assurance in dealing with eye patients.

While our routine for examination is the same as it is in the city, one is frequently forced to combine a lot of steps, even the dispensing of glasses, into one visit, because the patient may live far away and unnecessary visits have to be avoided. Naturally, difficult cases of refraction or muscle imbalance have to have repeated studies. Atropinization of children for three days before refraction is widely employed, but one can substitute a combination of atropine and neosynephrine for 90 minutes in the office and save the patient an additional trip.

Dispensing is a necessity in rural practice, because there are no dispensing opticians and the patient expects a fully integrated service. The correct type of lens in a properly fitted and cosmetically pleasing frame is as important to the patient as is the basic fact that the refraction was a correct one. The best refraction can be ruined by a poor dispensing job. To my mind, dispensing is part of the professional service the rural ophthalmologist renders. He is responsible for it, even though he may employ an aide for certain aspects of this work.

#### **Treatment of Disease**

Treatment of ocular disease follows accepted city standards. Laboratory facilities are usually available in the local hospital but one cannot always expect very exact differential diagnostic details as to a rare type of bacterium or more unusual procedures like tests for toxoplasmosis or highly differentiated skin tests. This is no great drawback, as most acute external eye conditions clear up with one of the sulfa derivatives or an antibiotic or a combination of the two. Many

epithelial inflammations of the cornea do likewise, especially when aided by cautery, iontophoresis and cortisone. In deep keratitis, uveitis and optic neuritis an effort is always made to find the etiology. But how often are we looking in vain and how infrequently do we receive a positive report from the family physician, from the laboratory—yes, even from the university hospitals or the Mayo Clinic. Confronted by this overwhelming number of negative investigations we frequently do our own Kahn and tuberculin tests and rely on non-specific treatment with atropine, cortisone, heat, fever therapy, etc. I doubt that our percentage of success in arresting these conditions is significantly less than in large city institutions.

Vascular and degenerative conditions in retina and choroid also call for general investigation. The rural ophthalmologist has to keep himself informed on the newer general measures for arteriosclerosis, vascular hypertension, diabetes and kidney disease, in order that he may discuss their possible advisability with the family physician. Specialists in the field of cardiovascular disease or diabetes may not be readily available; some drugs may have to be ruled out due to lack of proper laboratory supervision or because the patient himself cannot be relied upon. Whenever possible, the use of vasodilators, anticoagulants, diet and, where indicated, sympathectomy should be considered in cooperation with the general practitioner. While these measures may prove disappointing for the individual case, they are the best we have to offer to the patient at the present time.

Orthoptic training is at a distinct disadvantage in a rural area. One can

hardly demand extended trips several times a week to one's own office or to the larger centers in the city to get the benefit of procedures which, combined with all other methods at our disposal, produce perfect binocular vision in less than half of the cases. Proper orthoptic facilities in a single private practice are usually not even feasible for time and economy reasons. Under these circumstances we have to rely on the correction of the refractive error, patching, early surgery and follow-up by home training with stereoscopic exercises. Home training is not the ideal form of orthoptics, but it serves well for increasing fusional amplitudes in cases of normal retinal correspondence.

#### **Assistance of Nurses**

The eye surgeon who after completion of his training finds himself the lone oculist of the town's general hospital certainly does not have the medical or nursing assistance he has been used to. It is, however, possible to do safe and competent eye surgery with the sole assistance of a nurse, if one adapts the technique to this situation and does not attempt to do procedures which obviously need the facilities of larger centers. We average about 60 cases of major eye surgery annually in St. Mary's Hospital in Centralia, not counting enucleations, tearsacs, pterygia, small lid plastics and so on. These surgical facilities are important to the population of our area, because there is a great reluctance on the part of certain types of patients to go to the city and especially to a city hospital.

In cataract surgery one needs no highly trained assistance for two Stalard type sutures, followed by a keratome incision which is enlarged with

scissors. A complete iridectomy facilitates the delivery of the lens and minimizes the danger of prolapse in an ill-behaved patient. The intracapsular technique by tumbling is preferred to the one by sliding out from above. The occasional deliberate performance of extracapsular extraction in cases with mature cataracts produces satisfactory visual results and certainly reduces the incidence of vitreous loss.

Iridocleisis and trephine are well within the possibilities of small town surgery. So are procedures for recession or resection on the ocular recti muscles. Surgery on the obliques may also be done, but I prefer to leave it to colleagues who have frequent use for these procedures and are, therefore, fully familiar with it.

Detachment surgery is technically not difficult and can be done in small general hospitals if proper assistance and understanding nursing care are available. Pre-operative studies as well as surgical procedures demand time, patience and, as Arruga expressed it, "no watching of the clock." The patient will not be satisfied with a mere anatomical reattachment and the surgeon will be judged by the functional success. Considering all this, it may be wise to refer the four or five detachment cases one sees during a year to a city consultant who makes detachments his special interest.

#### **Importance of Consultation**

While the rural eye physician is alone in his area he should never hesitate to seek the cooperation of reliable and responsible colleagues in other towns or the next larger city, whenever there seems need for a second opinion. It is utter neglect to let a difficult case go on in order to avoid a

possible disagreement as to diagnosis or as to methods. The burden of the decision for enucleation or of surgery for advancing compensated glaucoma should always be shared by a consultant. Long-drawn-out cases of uveitis or keratitis deserve a second opinion for the patient's benefit and for the doctor's peace of mind.

#### Keeping Up to Date

It does not detract from the most efficient eye departments in our city hospitals if one emphasizes the importance of the task of the rural ophthalmologist. A majority of rural patients would not even obtain early and possibly sight-saving diagnosis were it not for his presence, his standing in his area and his cooperation with general physicians and optometrists, making them eye disease conscious. The education of the rural oculist should therefore not stop with his leaving his residency. He does not enjoy the continued advantages of working in large institutions with other experienced men. Lecture courses, books and journals form an important link to one's specialty. But they do not seem enough. Progress is constantly made. Cyclo-diathermy, beta irradiation, movable implants, crysophake extraction, gonioscopy, corneal transplants—all are examples of relatively recent progress. One is naturally hesitant to try new steps without the supervision of an experienced colleague. It would therefore be a great step forward for the rural ophthalmologist if ways could be found whereby he could take up a residency for two or three months every five years in one of the large centers. This would enable him to acquaint himself with new developments, to try new methods and to

refresh the efficiency and adequacy of his own techniques.

While we have periodic checks and safety measures in technical fields in the interest of the public, we blandly assume that a state or specialty board passed some decades ago still makes for a safe doctor. Fortunately, the assumption is correct for the majority of physicians. It would, however, greatly enhance the efficiency of practitioners in all fields if—beyond the scope of mere lectures—they had facilities to rub elbows again with their colleagues in the wards of our teaching institutions and to rejuvenate their methods, their thinking and, last but not least, their spirit. For the oculist practicing in a rural area it would round out the many satisfactions he derives from his professional activities.

#### IT PAYS AT FIRESTONE

"A penny saved may be a penny earned—but not when it comes to eyes," Alfred E. Bernel of the Firestone Steel Products Company commented in the November 1954 *National Safety News*. Eye protection had prevented five serious eye injuries in the preceding eight-month period at one of Firestone's Akron plants.

Aside from any other consideration, Mr. Bernel estimated that every dollar spent on eye protection for the five men concerned had saved the company \$1,924 in medical care or compensation costs.

Mr. Bernel reported that 60 per cent of all Firestone employees are furnished goggles, eye shields or glasses. In several plants 100 per cent eye protection is mandatory on hazardous occupations such as welding, grinding, chipping, machining, and the handling of chemicals and acids.

## Discussion of Dr. Hirschfelder's Article

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I FIND myself in agreement with much of what Dr. Hirschfelder has stated. The problem of providing adequate ophthalmological care to persons in small communities and in rural areas is vital if unnecessary blindness is to be prevented.

Of course many ophthalmologists prefer the mode of life in the metropolitan areas and the facilities and opportunities for surgery are better if one is adequately trained for such surgery. We in the smaller communities must be content to do refractions and office procedures for the most part; but as Dr. Hirschfelder points out we must be trained and ready for the surgical case who desires to remain at home or comes from the outlying areas to the smaller city for his eye care.

It is fortunate that we have so many colleagues in the surrounding metropolitan areas or larger cities who are most cooperative in consulting with us and advising us as to proper procedures in our problem cases. It is important that we have such consultations. We cannot afford to make errors.

Although the nurses in the smaller hospitals in many cases are not properly trained to care for eye cases, I find they can be educated; and by training them in our own way they are more valuable to us. In serving only one or two ophthalmologists they do not become confused by a multitude of surgical and medical procedures, as may occur with a large city staff. As physicians we are inherently teachers

and to teach ophthalmology to student and graduate nurses, as we must do, is stimulating.

We have no interns or residents in Corning Hospital and must therefore depend on the nurses to assist us in emergency work. With practice and reliance on our own resources we find we can attain results comparable to those in large institutions with their complex organizations.

As to the interest of the general practitioners in ophthalmological problems—I do not find it. For the most part they seem to be content to let their specialist confreres treat serious eye conditions. When they attempt to diagnose and treat eye conditions they usually get into trouble. That is why so many cases have been neglected in the past and relegated to hopeless blindness. I think general practitioners should be taught such procedures as removal of corneal foreign bodies if they have the facilities for magnification and a steady hand, but I do not believe that in general they have the interest, ability or adequate facilities for this delicate procedure. With reference to the referrals, why not have the practitioner refer any case with 20/20 or less if symptoms warrant? Let's get these pathological conditions in an earlier, more curable stage!

Quite certainly, optometrists are interested in conserving vision and can be taught to be on the alert for such conditions as glaucoma, cataract, retinitis and uveitis. We must maintain

good relations with them if we are to get the referrals and we must explain to them what we find if we are to keep up their interest. As the educational requirements for licenses are raised the problem will solve itself and I am sure a more cooperative spirit will be developed.

Since we must dispense our own glasses we must be familiar with the optical requirements of our patients. Indeed, this is an advantage even though due to pressure of work we must employ a dispensing optician or a less well-trained person to do it. In relation to this there is the need for more well-trained dispensing opticians if we are adequately to care for our patients' optical needs. I have always given my patients free follow-up adjustments. A good refraction may be spoiled by poorly fitted lenses or inadequate optical follow-up.

It is most certainly true that it behooves us to recognize general diseases and in many cases to help in their treatment, since we do not have specialized consultants. It has been my opportunity to see half a dozen neglected diabetics with advanced retinopathy and to get them started on a diabetic regime in the hope of preventing blindness. Cases of exophthalmic goiter are sometimes seen, and surgery is advised. We are constantly called upon to evaluate cases of hypertension and arteriosclerosis by means of eye ground studies. I am thankful that I had a two-year general residency before entering my specialty. With this background, I feel better qualified to advise such cases.

Dr. Hirschfelder has stressed the need of the rural ophthalmologist for post-graduate study. I too feel that we have little time to read journals, and

we need the contact of men who are working in teaching centers and research hospitals to guide us into newer fields of knowledge. But we can only do so much without intern or resident help. We must leave the more complicated and time-consuming procedures to our metropolitan surgical staffs. We must recognize our limitations. I feel that with the fine post-graduate courses offered by many medical schools and clinics, and especially the American Academy of Ophthalmology, we should make every effort to take advantage of two to four weeks' training every year. The residency of two to three months every five years would be fine if we were to use the more complicated techniques but I hardly think it would be worth the time away from practice. I believe that the refresher courses should be encouraged and augmented both for the ophthalmologist and for the general practitioner in rural areas.

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#### HAZARD OF "DEAD" BATTERIES

Recent items in the *Journal* of the AMA have emphasized the danger in "dead" batteries of the mercury-cell type used in almost all kinds of hearing aids. These batteries still contain an appreciable amount of mercury even after they have run down, and they may explode if tossed into an incinerator or trash fire. Since most people are not aware of this, they often discard the batteries with other refuse. In one case a man lost his right eye when a battery exploded in a bonfire he was watching. The tiny brass casing of the battery struck him in the eye, so completely destroying it that enucleation was necessary. In another case a man who also was watching a bonfire suffered a scalp injury resembling a bullet wound when a battery exploded. It is suggested that the old batteries be returned to the manufacturer when buying new ones.



# THE COSTS OF INEFFICIENT VISION

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inefficient vision represents a real and measurable cost to industry and to society—one that is grossly in excess of the cost of maintaining continuously good vision.\*

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ONE important aspect of the efficient utilization of all available manpower lies in the matching of job classifications to visual ability. A short time ago some statistics were published showing that the visual characteristics of the workers in a sample leather factory were considerably poorer than those of workers in a sample electronics factory. After an all too narrow consideration of the statistics from each factory the author of the report concluded that visual requirements in the electronics job were higher than the visual requirements in the leather making job. What the statistician failed to recognize was that the leather industry is old and the electronics industry is young; therefore the average worker in the leather industry was much older than the average worker in the electronics industry. Since adequate visual care was not being supplied in either industry the relative ages could account entirely for the difference in vision characteristics of the two groups of employees.

The same statistician served as consultant to both companies and in accordance with his own conclusions

\* Excerpts from a paper prepared for the Rutgers University Third Conference on Occupational Vision.

he recommended higher visual requirements for new employees in the electronics industry than for new employees in the leather industry. Obviously, if this leather company is going to accept new young employees with visual deficiencies comparable to the average of its current older employees, and if it does not institute and maintain a rigid program to insure continuous professional eye service to each employee, in about 10 or 15 years it is going to have some costly redesigning of jobs to engineer, or it will have to lay off a lot of trained and experienced employees because of inadequate vision.

## Classifying Visual Skills

It requires no complex statistical studies to convince even the most skeptical that there are great differences in visual requirements for different jobs. There are many jobs that can be done perfectly well with the eyes closed. Consequently, a great saving could be accomplished by guiding young new employees into jobs that correspond with their visual efficiency. Such a classification of workers can be done at negligible expense before employees are trained for the job. But this system can be made to work only if we incorporate with this classifica-

tion an auxiliary program of continuous care to maintain each employee at his original level of visual efficiency. Such a program is relatively inexpensive as compared to the alternative—the costlier program of fast labor turnover or of continuously redesigning jobs to accommodate reduced vision.

#### Factors Ignored

Ample evidence of the cost of inefficient vision can be found in a study of the factors which limit the rate of traffic flow. I use this term in its widest sense to include such things as the flow of assembly line production; controlling traffic at the railroad dispatch office; steering materiel traffic at the loading dock; facilitation of materiel traffic flow in the purchasing department of a large institution; channeling and moving automobile traffic on a busy street; directing human traffic in a theatre lobby; and the movement of people forming a cafeteria line.

A short time ago I sat in an audience at a conference on highway traffic safety in Los Angeles. Participating in the conference were selected representatives of the police force, the mayor's office, the city council, the highway engineer's office and other community agencies concerned with safety on the highway. Many excellent ideas were put forth including the lowering of speed limits; the more frequent arresting of violators; the placing of governors on taxicabs; the installing of more signal lights and SLOW signs; the providing of more pedestrian cross walks; the setting up of a safety propaganda program via radio, press and television; and the rewarding of safe drivers with honor citations and lowered automobile in-

surance rates. Now all of these methods have one factor in common, namely that of slowing down the traffic flow, and in Los Angeles that does not solve the basic problem, for if the rate of traffic flow is decreased as much as 10 per cent there will simply be a 10 per cent addition of automobiles to be involved in accidents on the already crowded Los Angeles streets.

Appropriately enough, a cab driver in the audience spoke up and complained about the lack of street-naming signs at many of the corners, and he tried in his own ineloquent way to relate this to the safety problem. He was politely ignored on the apparent assumption, first, that he was just a cab driver, and, second, that his idea had nothing to do with street safety.

In my own opinion, however, he had exhibited some genuine grass-roots thinking. Since hearing his remarks, I have observed and experienced personally what he was trying to convey. On more than one occasion I have narrowly missed scraping a fender, or hitting a child on a bicycle, or crashing a red light, while frantically trying to find the name of a street or a house number. Further, I have seen hundreds of automobiles harassingly delayed or endangered while some other driver was groping along trying to establish his bearings.

This problem is by no means limited to dangerous high-speed levels. It is just as serious at the 10 to 30 miles-per-hour level. Further, it has two aspects: the adequate provision of traffic control signals; and the assurance that each driver has vision adequate to see the signals easily and quickly.

While I have used a familiar example to illustrate my point, let me



add that the same principles apply to the afore-mentioned factory assembly line, railroad dispatch office, loading dock, purchasing department, theatre lobby or cafeteria. The visual problems in these and countless other traffic flow areas involve the assurance of adequate vision for such ordinary operations as reading, inspecting, labeling, checking, filing, matching, marking and computing.

#### Poor Vision Affects Morale

For a given individual the realization that he is visually handicapped is a harassment. If unwilling to recognize or admit his limitation he is forced to rationalize his status in the form of complaints, in the design of distractions to impede others, or in the vicarious attribution of his difficulties to other more acceptable causes much more costly to cope with.

The morale problem is not limited to the distress experienced by the worker with inefficient vision. In fact, he may have a pronounced influence on group morale even when he is psychologically adapted to his limitation, unless he is properly placed in a job where his limitation does not interfere with his production.

A short time ago I had occasion to observe an experienced carpenter work for several days on a small construction project. During most of the time he worked alone, with a genuine sense of enjoyment, accomplishment and pride. On two of these days he was assigned a co-worker who was also an experienced carpenter, a pleasant, congenial and cooperative fellow, but one whose vision was noticeably impaired. By the end of the second day the first carpenter was conspicuously harassed and frustrated, though he tried hard

to hide his concern. He frequently interrupted his own work to help locate a tool or to check on the second man's work. He obviously felt guilty when he caught himself trying to be helpful, but he certainly must have felt just as guilty when he tried to ignore his fellow worker's activities. He was continuously tortured by the feeling that he was having to assume an added share of responsibility over which he had no control.

#### Jobs for All

Of course all visual defects are not correctible, but the number that are helped is overwhelming in proportion. Further, there is a place in industry for those whose defects are not correctible. There are plenty of rewarding jobs which require very little vision. The very small number of people whose defects are incorrigible can be placed in worthy occupations where they can compete without any disadvantage whatsoever. The important fact which we must realize is that with proper and continuous professional visual care this group can be kept very small and can be given proper vocational guidance at a minimum of expense and with a minimum of placement error.

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#### AS THE CHINESE SAY

Noted in Meyer Berger's column in *The New York Times*—an item about the True Light Lutheran Church in lower Manhattan. The church, which has a large Chinese congregation, uses Chinese proverbs on its outer bulletin board, where most other churches are apt to place scriptural quotations. Recently posted there was the proverb: "Better to put a fence at the top of a cliff than to build a good hospital at the bottom."

# Diet Records of Sixty-Two Glaucoma Patients

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In this limited study of patients in the glaucoma department of the Institute of Ophthalmology, Presbyterian Hospital, New York City, no gross dietary deficiency could be correlated with the disease.\*

**G**LAUCOMA is a disease of the eyes due primarily to an irregularity in the physiology of the circulation of the aqueous and blood. The increased intraocular pressure is secondary to these irregularities and is not the primary cause.

In the search for original causes one can afford to overlook no factor which influences well-being, because of its possible relation to initiating or prolonging the disease. One of these factors is the effect of diet upon the mechanism as a whole, or its possible bearing upon the physiology of glaucoma.

The importance of proper diet to general well-being has long been known, but the first real impetus to the modern science of nutrition resulted from the studies of vitamins. It is also now recognized that conditioned malnutrition may result, even with an adequate diet, from concurrent disease, infection, or other metabolic disorder.

The patients in the glaucoma department of the Institute of Ophthalmology, Presbyterian Hospital, New York City, offered a unique opportunity to study the diets of glaucoma patients because they were under more

constant observation than the average glaucoma patient and therefore were more readily available for special study.

The general dietary habits of these patients were studied to determine whether there was any noticeable deviation from the accepted norm in quantity or quality of the dietaries.

## Sixty-two Patients

Table I indicates the age and sex distribution of the group studied. This is obviously an aging group; 94 per cent of the males and almost 96 per cent of the females are 40 years or over; 59 per cent of the males and 44 per cent of the females are 60 years or older.

The age distribution and occupational status indicate a lowered caloric requirement. The majority were found to be sedentary. Only four men worked part or full time at jobs that required limited activity. The women for the most part did light housekeeping or sewing.

The patients fall into a low or marginal income category, a number of them receiving department of welfare allowances.

The dietary data were obtained by a competent lay interviewer who was

\* Supported by a grant from the Elbridge Stuart Foundation through the National Society for the Prevention of Blindness.

TABLE I

Age and Sex Distribution of Sixty-two  
Glaucoma Patients

Age in Years	Males	Females
19.....	1	..
20-29.....	..	1
30-39.....	..	1
40-49.....	3	8
50-59.....	3	15
60-69.....	5	12
70-79.....	4	8
80-89.....	1	0

trained and closely supervised by the nutritionist in the methods of obtaining dietary information. The patients were requested to record the kinds and amounts of food consumed in terms of household measurements, and weights when possible, for the 24-hour period preceding the day of appointment for each visit to the glaucoma clinic. The dietary records were reviewed with the patients on the day of the appointment for possible omissions. Patients often tend to forget sugar used in beverages or butter used on bread.

The individual consumption records included from two to 20 samples covering a period of two to 18 months, depending on the frequency of the visits and the length of time the patient was known to the glaucoma clinic. Two to four diets randomly selected were calculated for each patient to determine intake of protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin, ascorbic acid and calories.

It is noteworthy that in relation to the nutritive equivalents of the foods consumed the dietary samples for any one individual on the whole were similar.

The reliability of the recall method as a means of appraising the adequacy of nutrient intake has been regarded

with a good deal of reservation. The pitfalls are many and obvious. On the other hand, such diet records represent a workable tool for approximating trends in nutritive intake so that gross dietary inadequacies can be detected. For appraising an individual's status relative to his nutrient intake, the diet record, reflecting his estimation of food consumption, is far less satisfactory than when used on a group basis.

The ability of individuals to estimate their food intake was studied by Young et al.<sup>1</sup> who showed that on a group basis errors of over- or underestimation in individual diet records tend to become equalized, yielding a mean value that is acceptable for gauging trends in nutrient intake. The methods used in collecting dietary data in this study are comparable to those used by the authors mentioned.

## Calculation of Records

The diet records of the 62 patients were calculated for eight nutrients by a "short method" developed by the Bureau of Nutrition, New York City Department of Health.<sup>2</sup> This method is perhaps more definitive as applied to lower income groups, for as a preliminary step the food records of large numbers of nutrition clinic patients were studied to establish patterns of food usage. Thus irrelevant foods from the point of view of usage were excluded, and popularly used foods given proper consideration in grouping foods of similar nutrient values.

The food composition tables used were those of the United States Department of Agriculture, Handbook No. 8.<sup>3</sup>

Fifteen dietary records randomly selected were calculated by the long

method and the results were compared with those using the "short method." No significant differences were found.

The "short method" for calculating the nutrient components of diets mentioned above does not include caloric values. For as Dr. Jean Mayer<sup>4</sup> pointed out, in methods currently used in obtaining diet information the caloric value of foods seems to be represented less satisfactorily than the protein, mineral and vitamin content. In our own clinic experience, we found that patients remember satisfactorily the kinds and amounts of foods consumed for a day or two but are unable to estimate the amounts of fat used for flavoring, whether a portion of meat is lean or moderately fat, or the amount of sugar used for flavoring and beverages.

Nevertheless, it was decided to calculate the caloric values by the long method (using U. S. Department of Agriculture food composition table loc. cit.) to enable us to gauge the adequacy of the thiamine intake which depends on caloric consumption.

#### Findings of Records

The mean caloric intake of the 17 males was 1,620 calories, for the female group 1,550 calories. These values fall well within the theoretical esti-

mate made by Dr. Norman Jolliffe<sup>5</sup> for males and females within the age and activity range described here. The physical appearance of these patients corroborates a low caloric intake, for with a few exceptions they can be described as thin people.

In appraising the findings of Table II it must be kept in mind that this is an aging group, the men being older than the women. Moreover, the total number of men is relatively small and errors in individual over- or under-estimation of amounts of food consumed may show up more readily as compared with a larger sampling.

The findings on the 45 female patients in Table II indicate mean values for protein, vitamin A, niacin and ascorbic acid fully meeting the National Research Council allowances. The other mean nutrient values fall within the allowances to this extent—calcium 64 per cent, iron 83 per cent, thiamine 78 per cent and riboflavin 90 per cent. The calcium value is markedly lower than the other nutrients and constitutes a more serious deficiency. Despite the low caloric intake, the thiamine falls below the accepted allowances which provide for .5 milligram per 1,000 calories with a minimum of one milligram per day (niacin 10 times the thiamine value).

TABLE II

Mean values of 8 nutrients for 45 female and 17 male glaucoma patients compared with National Research Council Recommended Allowances (6)

	Protein gm.	Calcium gm.	Iron mg.	Vitamin A I.U.	Thiamine mg.	Ribo- flavin mg.	Niacin mg.	Ascorbic Acid mg.
Females—45. . . . .	65.9	0.51	9.9	6,528	.78	1.26	12.5	83
NRC Allowances.	55.0	0.80	12.0	5,000	1.00	1.40	10.0	70
Males—17. . . . .	64.1	0.59	9.3	5,102	.86	1.39	11.2	66
NRC Allowances.	65.0	0.80	12.0	5,000	1.00	1.60	10.0	75

Summary of Ohlson's findings on recall diets—mean daily intake

Calories	Protein	Calcium	Thiamine	Riboflavin	Vitamin A	Ascorbic Acid mg.
2400-3500. ....	65	0.63	1.31	1.54	4,222	53
2000-2399. ....	75	0.56	1.29	1.50	4,286	63
1500-1999. ....	55	0.44	0.91	1.13	4,766	53
1000-1499. ....	42	0.36	0.70	.87	3,225	53
Less than 1000. .	33	0.21	0.61	.57	1,931	29

The figures for the male group indicate a mean value for protein, vitamin A and niacin approximately within the National Research Council allowances. Thiamine, riboflavin and ascorbic acid meet the allowances at a level of approximately 85 per cent and iron and calcium at 75 per cent.

There are very few data with which this dietary study can be compared. The experience in the nutrition clinics of the Department of Health, with adult groups, indicates a consistently less than adequate consumption of milk, which would be reflected in the calcium and riboflavin values, as well as citrus fruits and leafy green or yellow vegetables which contribute abundantly to ascorbic acid and vitamin A values respectively.

The trend in food consumption on the part of the glaucoma patients suggests better than average practices as known to the nutrition clinics in several ways. The female group consumed on an average of one portion of citrus fruit (1 medium-sized citrus fruit or 4 oz. of juice) daily. The male population consumed about  $\frac{2}{3}$  of a portion. The female group averaged  $\frac{1}{2}$  portion ( $\frac{1}{2}$  cup considered a portion) of leafy green or yellow vegetables daily. The men consumed about  $\frac{1}{2}$  the amount. Leafy green vegetables and yellow vegetables are a prominent source of carotene and it is difficult to get ade-

quate vitamin A (5,000 I.U. units daily per adult) unless these vegetables are included in the diet at least several times a week. The frequency with which carrots appear in these dietaries, particularly in the female group, would suggest a magical association of carrots with good eyesight in the minds of some of the glaucoma patients.

With the exception of the mean values for vitamin A and ascorbic acid the dietaries of these glaucoma patients studied do not seem to differ from those of the adult population seen at the New York City Health Department nutrition clinics.

The values for vitamin A and ascorbic acid are also higher than those found by Ohlson et al.<sup>7</sup> who calculated 100 consecutive 24 hour recall diets of older women (40-78 years).

In comparing the mean nutrient intake of the glaucoma patients with Ohlson's findings at the level of 1,500-1,999 calories the former group seems to have fared somewhat better in the intake of all but the thiamine component. The vitamin A and ascorbic acid mean values are considerably higher for the glaucoma patients.

Although the limitations of evaluating nutrient adequacy for the individual on the basis of diet records was pointed out above, it is nevertheless tempting to examine individual per-

formance as a rough approximation of the degree of individual deviation from the accepted goals of the NRC.

Table III indicates that three-fourths or more female patients fall within 81-100 per cent of NRC allowances for protein, niacin and ascorbic acid; about two-thirds approximate this level for vitamin A and riboflavin; one-third to about half for thiamine and iron respectively. Only 22 per cent

of the women are within the 81-100 per cent of NRC allowances.

Approximately half to three-fourths of the male group failed to reach 81-100 per cent of NRC goals for all but two of the nutrients—protein and niacin. Again calcium seems to be the most limiting factor.

Tables II and III indicate that the dietaries of the female group were more satisfactory on the whole than

TABLE III  
Nutrient Intake of 45 Female and 17 Male Glaucoma Patients Compared with National Research Council Recommended Allowances

Per Cent of NRC Allowances		Protein		Calcium		Iron		Vitamin A	
		No. of Patients	Per Cent	No. of Patients	Per Cent	No. of Patients	Per Cent	No. of Patients	Per Cent
81-100	Female.	42	93	10	22	21	47	30	67
	Male...	13	76	5	29	7	41	9	53
50-80	Female.	3	7	23	51	24	53	9	20
	Male...	4	24	7	42	10	59	3	18
Under 50	Female.	0		12	27	0		6	13
	Male...	0		5	29	0		5	29

Per Cent of NRC Allowances		Thiamine		Riboflavin		Niacin		Ascorbic Acid	
		No. of Patients	Per Cent	No. of Patients	Per Cent	No. of Patients	Per Cent	No. of Patients	Per Cent
81-100	Female.	16	36	28	62	40	89	35	78
	Male..	8	47	9	53	15	88	9	53
50-80	Female.	27	60	16	36	5	11	5	11
	Male..	9	53	7	41	2	12	3	18
Under 50	Female.	2	4	1	2	0		5	11
	Male..	0		1	6	0		5	29



those of the male group. It should be borne in mind, however, that the male group is older and is less well represented than the female group.

#### Summary and Conclusions

Diet records of 62 glaucoma patients were calculated for calories and eight nutrients. The mean nutrient values indicated dietary deficiencies most conspicuously in relation to calcium and to a lesser degree in relation to iron, thiamine, riboflavin and ascorbic acid for the male group only. On an individual basis it is safe to say that only a few dietaries reflected adequate intake in all the nutritional components. This situation, however, is not unique to this group of glaucoma patients. Other groups of approximately the same age, and socioeconomic status seem to share similar dietary deficiencies, the most prevalent being calcium. In this limited study no gross deficiency could, therefore, be correlated with glaucoma.

The high mean values for vitamin A and ascorbic acid were found fairly consistently but it was impossible to assess their effect upon the status or progress of the glaucoma.

A full answer to the question of the relationship of diet to glaucoma will have to be evolved slowly. The economic factor plays a large part in this age group, the stress and strain of the process of aging may indicate greater needs for some of the nutrients. Without long-term strict supervision, the many variables could not be controlled properly. But with continued study embracing many groups and controlling one factor at a time it is hoped that some questions will be resolved.

Grateful acknowledgment is made to Willis S. Knighton, M.D., glaucoma

department, Institute of Ophthalmology, and associate clinical professor of ophthalmology, College of Physicians and Surgeons, Columbia University, for selection of patients, for providing basic information about the eye disease and for technical aid.

Grateful acknowledgment is also made to Norman Jolliffe, M.D., director, Bureau of Nutrition, New York City Department of Health, and Robert S. Goodhart, M.D., scientific director, National Vitamin Foundation; chief, Nutrition Clinic, Washington Heights Health Center, New York City Department of Health, for their critical evaluation and suggestions.

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## NEW TOOLS IN HEALTH EDUCATION

The Cleveland Health Museum's suitcase exhibits, including one on "Why We Need Glasses," are in great demand by educators and public health nurses.

THE Cleveland Health Museum is constantly experimenting with more effective ways to visualize health concepts. Among its latest projects is a series of suitcase exhibits developed for classroom use.

Dr. Winifred G. Doyle, the museum's curator of education, says that the suitcase idea has proved to be an appealing one that has had wide ac-

ceptance among health educators and teachers throughout the country. If the subject matter is adapted to existing health curricula; if the design is such that the exhibit is easy to carry, unpack and pack; if the execution of the exhibit combines texture, color and gadgetry in the right proportions the result is an attractive, versatile self-contained teaching tool suitable



The Cleveland Health Museum's first suitcase exhibit on "Why We Need Glasses." In a later version a Snellen chart is shown with a series of cards for testing color vision, and a near-vision chart.



for use at many grade levels by many classes many times in the school year.

These suitcase units represent the combined efforts and talents of many people in the Cleveland area—educators, physicians, dentists and nurses. Laboratories and supply houses have also cooperated.

Dr. Doyle emphasizes that although this project developed out of local demand it is not confined to a particular school health program. The subjects are of common concern to health educators everywhere. They include, among others, good grooming; proper food; rest and sleep; good posture; how blood travels; care of the teeth; how we hear; why we need glasses; how food travels.

In the exhibit titled "Why We Need Glasses" four eye defects are shown: nearsightedness, farsightedness, astigmatism and double vision. Plastic slides hang on pins over diagrams of the eyeballs to show how the defects are corrected with lenses. These are enlarged and exaggerated to emphasize their shape in cross section. A dissectible eyeball is included in the exhibit, along with eye testing charts.

The suitcase on the eye, reports Dr. Doyle, not only provides the regular classroom teacher with excellent materials for teaching these units, but also makes a splendid aid for the school or public health nurse in her screening and testing. It is an all-too-familiar experience to see health services completely divorced from health education, when so many fine opportunities present themselves during the course of a school year to combine them.

**CONVENTION ISSUE** — Papers presented at the National Society's 1955 Conference will appear in the Summer Issue of the *REVIEW*.

### Meeting of NSPB Committee on Education of Partially Seeing

The National Society's standing Advisory Committee on Education of Partially Seeing Children met in New York City all day, October 5, 1954. Members present were: Mrs. Hazel C. McIntire, *chairman*; Mrs. Dorothy Bryan, Florence V. Essery, Ph.D., Dr. Gabriel Farrell, Miss Lorraine Galisdorfer, Romaine P. Mackie, Ph.D., Miss Marjorie Toland, Charles C. Wilson, M.D.

### Methods of Educating

The Committee reviewed the co-operative methods of educating partially seeing children: (1) the traditional plan, in which children are enrolled in a special class under the direction of a specially prepared teacher and join their normally seeing companions for work not requiring close use of the eyes; (2) the regular-class plan, in which children are enrolled in their regular grades and have seats assigned to them there, so that they are a part of the regular class but use, when necessary, the specially equipped resource room in charge of a specially prepared teacher; (3) the itinerant (or contact) teacher plan, in which children remain in their regular classrooms and are there brought special assistance through the visiting special teacher who advises and assists the classroom teacher and often works with the child in a more or less tutoring capacity.

The discussion indicated that the itinerant-teacher plan is the only feasible one in rural situations where neither special classrooms nor resource rooms could be available, largely because of the small number of partially

seeing children. In general it was thought that for the present at least the best plan is the regular-class placement plan. However, it was pointed out that where the traditional plan is well carried on it need not be changed.

#### **Preparation of Teachers of Partially Seeing**

The recommended 120-clock hour course for the preparation of teachers of the partially seeing was reviewed. The relative merits of a six-weeks' intensive summer course versus a course given during the academic year were discussed and it was the consensus that the course should be offered as a unit and that the summer session afforded best opportunity for this. It was agreed that such course should be given on the graduate level and be open to those having a background of undergraduate work in areas relating to personal and community health, school and community health and the general program for the exceptional child. Ways and means of improving facilities at the colleges and universities offering such courses were considered, and it is planned that the Committee will draw up a statement of these needs for presentation to state and college personnel directly involved.

#### **Preparation of Regular Teacher**

The qualifications suggested for candidates to take the special course for teaching the partially seeing led to a discussion of what preparation the regular teacher in training should have. It was agreed that all classroom teachers need to understand personal and community health, school health programs, general problems in the field of the exceptional child and especially how to recognize a problem and where

to go for help, before they begin to specialize in any one area. An excerpt from the study\* of 40 selected teacher-training institutes was read which indicated the deficiencies revealed in health services, instruction and environment. This pointed up the need to provide the teacher in training with an optimum visual environment and to integrate more material on eye health and vision in courses on personal and community health. In order to bring an awareness of these background needs to teacher-training institutions, it is hoped that the Committee on Education of Partially Seeing Children may have an opportunity to work cooperatively with those responsible for developing standards for the preparation of teachers.

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### **1955 NSPB CONFERENCE**

An unusually interesting program has been arranged for the 1955 Conference of the National Society for the Prevention of Blindness to be held at the Hotel Statler, New York, March 16-17-18.

Latest reports on methods of preventing blindness and improving eye care will be presented. The three-day meeting will open with a discussion of community approaches to saving sight, including the role of volunteers. Other sessions during the conference will include a review of such topics as public health promotion of eye health at the state and local level; interpreting eye disease to the patient, family and community; industrial sight con-

\* A Survey of College Health Programs for Prospective Teachers with Special Reference to Eye Health. National Society for the Prevention of Blindness, Pub. No. 242. \$1.00.

ervation programs; the use of communications media to inform the public about eye care and protection; and latest developments in the education of partially seeing children. A special meeting will be devoted to most recent developments in eye research, with a review of progress in controlling leading causes of blindness.

Various papers presented at the conference will appear in succeeding issues of SIGHT-SAVING REVIEW.

### BRITISH REPORT ON RLF

A dramatic report recording the disappearance of blindness due to retrolental fibroplasia in two English nurseries for premature infants appeared in *The Lancet* of August 7, 1954. In this Drs. R. M. Forrester, E. Jefferson and W. J. Naunton relate the decline in the incidence of RLF cases to restriction in the use of oxygen. Their studies were made at St. Mary's Hospital and the Duchess of York Hospital in Manchester.

A total of 83 cases occurred in these two nurseries between 1947 and 1954, 36 of them with permanent changes. During 1947 and 1948 only one case was reported at St. Mary's Hospital, and it was noted that up until that time oxygen tents were used only on rare occasions there. The unit at the Duchess of York Hospital was opened in 1949 and full oxygen facilities, including tents, were available at once. Intensive use of oxygen began in both units during 1949 and developed gradually, reaching its peak in 1951, when many infants were exposed to concentrations of 80 per cent. During 1950 and 1951 there were 32 cases of retrolental fibroplasia with permanent changes, 20 of them blind.

Since October, 1951, the amount of oxygen used for each infant has been severely limited and since November of that year there has not been a single case of blindness due to retrolental fibroplasia at either hospital. The incidence of incomplete and temporary changes has been similarly reduced.

The authors assert that these observations confirm the important role which oxygen plays in transforming a rare and sporadic disease into a major cause of blindness. They are satisfied that the elimination of the disease by restriction of oxygen can be achieved without detriment to the survival rate.

### OXYGEN DIRECTIVE IN NEW YORK HOSPITALS

The Pediatric Advisory Committee of the New York City Department of Health last year reviewed the subject of oxygen administration to premature infants, now known to be definitely associated with retrolental fibroplasia. Acting upon the unanimous recommendation of this committee, the Department of Health has since issued a directive to all hospitals having maternity and newborn services, to the effect that oxygen administered in the delivery room or nursery should be used only when indicated, and at concentrations not to exceed 40 per cent.

A report on this action in the December 5, 1954, issue of *New York Medicine*, official publication of the New York County Medical Society, urged all physicians to follow this recommendation. It was emphasized that there had been a considerable drop in the incidence of blindness due to retrolental fibroplasia since the concentration of oxygen administered to infants was reduced.

## NOTES AND COMMENT

### • Contact Lenses Improved

"Many people who believe that thick spectacles handicap them in business or social life, or because of operations on the eye or certain diseases of the cornea are unable to use spectacles, are finding satisfaction in either the new contact lenses or corneal lenses," report Dr. Maurice W. Nugent and Dr. Conrad Berens in the September 1954 issue of *Today's Health*. The importance of prior examination by a qualified eye doctor is stressed, however. The lenses will be prescribed only if they appear suitable for a given case. Careful continuous observation of the patient's eyes while the lenses are first being worn is an absolute must. About one-third of the persons who are fitted for these lenses find they are unable to tolerate them, the authors state. Another third can wear them for limited periods of time; the remainder can wear them to the exclusion of spectacles.

The new type of corneal lens, worn directly over the cornea and iris, is less than half an inch in diameter. It does not extend over the sclera but is held in place by the curvature of the cornea and the surface tension of normal tears. The new contact lens has a central part which covers the cornea and a flange that reaches out over the sclera. It also has small holes, or channels, to promote better circulation of tears. Contact lenses of the older type required an accessory solution which

proved a stumbling block for most patients, but the new ones require only the wearer's tears to operate successfully.

The newer lenses, both contact and corneal, cause less irritation and blurring than the old contact type, and give much better wearing time to a greater number of patients. It is suggested, however, that the old type should not be entirely discarded as a small number of patients still get better results with them.

The complete article by Dr. Nugent and Dr. Berens has been reprinted by NSPB. Copies are available at five cents each.

### • Five-Year Trachoma Research

The Arabian American Oil Company has embarked upon a five-year \$500,000 research program with the Harvard School of Public Health in an effort to discover a vaccine for the prevention of trachoma. Announced in November of 1954, this constitutes the first large-scale attempt to combat the blinding disease through specific prevention. All major efforts in the past have been directed primarily toward discovering a cure.

Aramco will contribute funds at the rate of \$100,000 annually and will make available the facilities of its new medical center in Dhahran, Saudi Arabia, where a large part of a second-floor wing in the Dhahran health center, including three ultra-modern labo-

ratories, has been reserved for the project. Harvard will provide the professional and technical staff for studies both in Arabia and in its own laboratories in Boston. The research group will be headed by Dr. John C. Snyder, dean of the School of Public Health, and will include Dr. Edward S. Murray and Dr. Robert Shih-man Chang.

Described by the World Health Organization as a "serious social scourge," trachoma afflicts millions of people in all parts of the world, with thousands of its victims eventually becoming blind in one or both eyes. It is widespread in the Middle East, the Far East, parts of South America, Africa and Asia, and throughout central and eastern Europe. In some areas of the Middle East 80 to 100 per cent of the population are affected, and many of these people carry the disease from birth until death. Even in the United States, where trachoma is well under control generally, it still makes its appearance among many of the Indians.

The first step in the research program set up by Aramco will be the collection of infectious material from trachomatous persons, particularly in Saudi Arabia. The group will then attempt to grow the virus in tubes so that large amounts will be available for study, with production of a safe and effective vaccine to prevent trachoma as the ultimate goal. At the same time the researchers will work toward a quick, accurate means of diagnosis. Efforts will also be made simultaneously to halt the spread of the disease through treatment, elimination of possible transmission agents such as insects, correction of insanitary conditions, and by trying to build up the resistance of persons who are subject to exposure.

#### • "Sun-Tan" Machines

A potential danger to eyesight made its appearance in the District of Columbia last summer in the form of coin-operated, ultraviolet "sun-tan" machines which were being installed in the locker rooms of a number of swimming pools. These units were also being distributed in other cities throughout the nation. The machines consisted of four fluorescent sun lamps backed with a metal reflector, and provided five minutes of irradiation by means of a coin-controlled mechanism. Users were advised to "wear the glasses provided or close eyes," but none were provided. Furthermore there was no shielding device to protect the casual observer from the lamps' rays.

The existence of this hazard was called to the attention of the District of Columbia Department of Health when complaints were received from two individuals who required hospital treatment for eye injuries subsequent to exposure to the lamps.

After investigating this situation D.C. health authorities decided upon a policy requiring that all ultraviolet irradiation devices for public use be shielded, and that single-use eyeglasses be furnished to patrons. Both the shields and the eyeglasses must be opaque to ultraviolet. In addition a qualified attendant, certified as competent by a licensed physician, must be present whenever the device is in use. This attendant is to be responsible for preventing excessive and repeated use by any individual.

#### • Ozone Discredited

Although ozone has been recommended as a satisfactory method of sterilizing Polaroid 3-D viewers this

claim is invalid, according to a letter of Dr. Herman N. Bundeson, president, and Dr. Francis A. Dulak, secretary, of the Chicago Board of Health, published in the June, 1954 issue of the *American Journal of Public Health*. Their opinion is based on results of experiments conducted by the Board of Health's Division of Laboratories, using 64 viewers contaminated with freshly grown bacteria cultures. Thirty-two of these were exposed to a continuous flow of an atmosphere containing ozone in a Model C Ozone Generator built by the Electro-Aire Corporation of Long Island City, while the remaining 32 were placed in plain metal cabinets at room temperature. Half of each group were removed after 30 minutes and the rest after 60 minutes.

It was found that exposure of the contaminated viewers to ozone in the generator did not destroy an appreciably greater number of bacteria than were destroyed by mere drying and exposure to air. Sterilization was not accomplished, and the bacteria remaining were too great in number to justify the statement that the viewers were properly sanitized.

Dr. Bundeson and Dr. Dulak express the opinion that methods for the sanitizing of 3-D viewers must include either (1) complete immersion in a detergent solution, followed by rinsing, immersion in a disinfecting solution, and again rinsing; or (2) where complete immersion is not possible due to the use of cardboard or a water soluble polarizing film, the plastic frames should be wiped thoroughly with a cloth saturated with a solution of an approved disinfectant. Viewers made entirely of cardboard should be discarded after one use.

#### • Wayne Extends Program

Wayne University has extended its training programs for persons working with exceptional children and for rehabilitating disabled adults. Since 1930 the University has had curriculums in special education leading to bachelor's and master's degrees for teachers of each type of exceptional children, including teachers of the partially seeing.

Beginning in September 1954 doctoral work in special education leading to the degree Doctor of Education was authorized. Also since last September a major has been authorized in Rehabilitation Counseling, leading to the degrees Master of Arts and/or Master of Education.

#### SUMMER COURSES

The National Society has received word from the following colleges and universities that they will offer during the 1955 summer session the complete course recommended by the National Society for teachers and supervisors of the partially seeing. Detailed information may be obtained by writing to the individuals indicated:

Illinois State Normal University, Normal, Illinois. Date: June 20-August 12. Dr. Rose E. Parker, Director, Division of Special Education.

San Francisco State College, San Francisco, California. Date not yet announced. Mrs. Florence Henderson, Associate Professor of Education.

Syracuse University, Syracuse, New York. Date: July 5-August 12. Dr. William M. Cruickshank, Director, Division of the Summer Sessions, School of Education.

Wayne University, Detroit, Michigan. Date: June 22-August 6. Dr. John W. Tenny, Gen. Adviser, Special Education.



## ETHICS OF OPHTHALMOLOGICAL PRACTICE

At the request of the Judicial Council of the AMA a statement regarding the ethics of practices in the field of ophthalmology was submitted by a joint committee of the Section on Ophthalmology of the American Medical Association, the American Academy of Ophthalmology and Otolaryngology, and the American Ophthalmological Society, and was adopted by the House of Delegates of the American Medical Association in December 1954.

The statement, published in the *Journal of the AMA*, December 25, 1954, relates to the position of these organizations in regard to ophthalmologists who, in addition to their professional fee for services rendered, dispense glasses to their patients. It is as follows:

"Ophthalmologists are subject to all the principles of medical ethics of the American Medical Association. But in order to clarify certain of these principles in relation to the specific practice of ophthalmology, the following statements are considered advisable:

"According to a resolution passed at the executive session of the Section on Ophthalmology of the American Medical Association on July 4, 1946. . . . It is within the definition of medical ethics for . . . (ophthalmologists) to engage in lectures, demonstrations, the preparation of pamphlets, and other measures suitable for the dissemination of information designed to prevent blindness and directed to any non-medical group.

"The dispensing of glasses should be considered in the same light as that of writing prescriptions for medicine or in the light of the relationship between the orthopedist and the brace maker.

"Ophthalmologists cannot ethically provide glasses for their patients unless the

service is unavailable without hardship or inconvenience to the patient.

"It is unethical for ophthalmologists to profit from the sale of glasses.

"Ophthalmologists cannot derive income from merchandising and still be considered on a professional level.

"Ophthalmologists may not accept rebates from optical houses.

"It is unethical for an ophthalmologist to profit from the services of an optician, working either in his office or on a referral basis.

"Fee splitting, in any form, is unethical whether it be with a physician, optician, optometrist, or a firm engaged in furnishing instruments, drugs, apparatus, laboratory work or Roentgen Ray examination for an ophthalmologist.

"However, when an insurance company pays a lump sum for a service, each doctor who shares in doing the job should share or prorate the fee in proportion to how much work each did, providing it is all clearly stated to the company and to the patient."

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## AAOO HOME STUDY COURSES

The 1955-1956 Home Study courses in the basic sciences related to ophthalmology and otolaryngology, offered as a part of the educational program of the American Academy of Ophthalmology and Otolaryngology, will begin on September 1 and continue for a period of ten months. Detailed information and application forms can be secured from Dr. William L. Benedict, executive secretary-treasurer of the Academy, 100 First Avenue Building, Rochester, Minnesota. Registrations should be completed before August 15.

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## NEXT YEAR'S NSPB CONFERENCE

March 26-27-28, 1956

Palmer House  
Chicago, Illinois

## LESLIE DANA

Leslie Dana, internationally known for his leadership in prevention of blindness activities, died in St. Louis, Missouri, on January 3, 1955, at the age of 82.

Mr. Dana, a distinguished citizen of St. Louis, was for more than 30 years president of the Charter Oak Stove and Range Company. Twenty-five years ago he established the Leslie Dana Award for outstanding service in the field of blindness prevention. The award has been given annually to physicians, educators, welfare administrators and others who have made notable contributions to the conservation of vision.

A special merit medal and an honorary lifetime membership in the National Society for the Prevention of Blindness were presented to Mr. Dana on December 14, 1950. The inscription on the medal reads:

*To Leslie Dana in appreciation of service of world wide significance for the advancement of eye research and the prevention of blindness, 1950.*

## COMMISSION TRAINS BLIND

Many blind people are being rehabilitated every year, both medically and vocationally, through the efforts of the New York State Department of Social Welfare's Commission for the Blind. The Commission's objective is to train these people for jobs they can hold on a competitive basis with sighted persons, on their own merits as trained, skilled, productive workers. According to the latest annual report of the Department of Social Welfare, more than 1,400 blind men and women in the state have been trained for and placed in a wide variety of jobs, helped

to establish their own businesses, or otherwise aided by the Commission to become self-supporting during the past five years.

In addition many blind trainees have had some measure of sight restored. These include many people in the 60-70 year age bracket, in good general health, who have regained enough vision through medical and surgical care to become employable in such occupations as doorman and service worker. A number of accident victims have also benefited by this care. The department's report gives brief histories of several cases.

## THE FINER ART

Probably few of the late Winifred Hathaway's friends and associates in the field of education know of her gift for poetry. Modest in this, as in all things, she rarely mentioned her published verse. Her dedication to her work as an educator and her deep respect for the profession of teaching are beautifully expressed in this poem written 30 years ago.

## SUBLIMATION

I do not work with marble or with clay.  
No peach blow vase of mine will ever stand  
As symbol of the potter's magic hand;  
No Aphrodite see the light of day  
Because I freed her from her marble thrall.  
And yet, perchance, mine is the finer art;  
I work with mobile things,—the mind  
and heart  
Of ever changing childhood. Mine the call  
To plant the seed, to pluck the tares, to know  
That in each garden's nurturing, the whole  
Of life is the unfolding of a soul!  
God grant me grace to give it room to grow!

Winifred Hathaway

September, 1924



## AROUND THE WORLD

### AUSTRALIA

**Research Institute Founded**—Establishment of The Ophthalmic Research Institute of Australia, recently announced in the Ophthalmological Society of Australia's *Transactions* (Vol. XIII), represents a major triumph in the battle against blindness in that country.

Ophthalmic research in Australia is said to have been seriously impeded in the past by the fact that the National Health and Medical Research Council, which handles all government grants for medical research, rejected most applications coming from ophthalmologists.

Because of this attitude the Society decided in 1950 to establish an independent research fund for ophthalmic purposes. This has been approved by the government. Although the Institute was sponsored by the Society it is legally an independent body with all the responsibilities and advantages of a limited liability company under Commonwealth law. In this respect it is unique in Australian medical circles. The founders are confident that it will have a beneficial and far-reaching effect on the public welfare through future advances in ophthalmology and the anticipated progress in prevention of blindness.

### ENGLAND

**Hazards in Quarrying**—In England mining and quarrying take precedence even over the metal-producing and metal-working industries in frequency and severity of eye accidents. Although granite cutting is a comparatively small trade, British quarries

have a yearly eye accident rate of about 9 per 1,000 persons employed. This is almost double the rate for coal mining.

No matter what process quarry workers may be engaged in, their eyes are exposed to the hazard of flying chips. It is reported to be nearly impossible to get these men to wear protective goggles, however, due to an even greater danger for which they must always be on the alert—the danger of sudden death from heavy falls of stone. Because goggles may become blurred from rain or sweat the quarrymen refuse to wear them, preferring the risk of eye injury.

In discussing this problem *The Optician* of December 31, 1954, comments on the pressing need for goggles which will shield the eyes from chips of stone without misting or cutting down the field of view. Until such protection is worn the eye injury rate will continue to be tragically high among quarry workers.

### FINLAND

**Eye Operations and Age**—Three researchers in Finland recently carried out a study of the incidence of internal complications in patients operated on for cataract and detachment of the retina, to determine the risk connected with these operations and the effect of prolonged bed rest on patients in the older age brackets. The group studied consisted of 1,235 patients with cataract and 115 with detached retina, their ages ranging from 40 to 90 years.

A note in the *A.M.A. Journal* of December 4, 1954, states that the incidence of internal complications in connection with these operations was

found to be very low. The most frequent was pulmonary infection developing from hypostasis, which was seen in 27 of the cataract patients and six of those with detached retinas. Four patients with cataract and one with a detached retina had thrombo-embolic complications.

Most of the complications healed quickly, but two pulmonary involvements and one embolism resulted in death. In addition there were three sudden cardiac deaths, bringing the total mortality to 0.4 per cent. It was concluded that age is not a direct contraindication of these eye operations.

#### IRAN

**Drugs Evaluated in Trachoma**—Reports submitted by mobile ophthalmic units in various rural sections of Iran have indicated a relative frequency of trachoma of nearly 100 per cent. In the Fars province, which has a frequency rate of more than 90 per cent, an experiment was carried out to evaluate the effectiveness of five drugs in combatting this disease on a mass basis. The results are reported in the November, 1954 issue of the *American Journal of Ophthalmology* by Dr. Alfred S. Lazarus of Seattle and Dr. Mohamed Farpour of Shiraz, Iran, who conducted this study as part of the program of the Technical Cooperation for Iran (Point Four).

A total of 616 previously untreated children from five village schools near Shiraz were treated three times daily, with a different drug utilized in each school. The drugs were Elkosin, sodium sulamyd, copper sulfate-methylene blue, terramycin and aureomycin, all by local application. Final evaluation was made after 93 days, which included only 68 days of treatment since

it was impossible to see the children except on school days.

At the end of that time improvement was most noticeable in the group receiving the copper sulfate-methylene blue treatment, with only 14 per cent of the cases still judged clinically active. The antibiotics were somewhat less effective (clinically active cases at termination of treatment represented 29 per cent of the aureomycin group and 48 per cent of the terramycin group), while the sulfa compounds, when applied topically, were least effective of all. Seventy per cent of the cases treated with sodium sulamyd and 80 per cent of those treated with Elkosin were still judged clinically active at the end of treatment.

On the basis of these results Dr. Lazarus and Dr. Farpour feel that none of the drugs they used offer a satisfactory solution to the trachoma problem. While it is possible that their failure resulted from inadequate treatment schedules, particularly where the antibiotics were concerned, the two doctors believe that the schedules followed represent the maximum program which could reasonably be planned with due consideration for available personnel and finances, and in view of the need for minimal interruption of the daily routine.

#### JAPAN

**Contributions to Ophthalmology**—"Postwar Ophthalmology in Japan" was the subject of an interesting editorial by Dr. Yashushi Nakamura in the September, 1954, issue of the *American Journal of Ophthalmology*. Dr. Nakamura, a member of the Board of Directors of the Japan Ophthalmological Society, noted that this Society now has almost 1,500 mem-

bers. Due to language difficulties, however, their work has not been well known outside their own country.

In describing the work being done on diseases of the retina the author stated that Dr. Kohei Ohasi, of Jikei University, had reported treating retinitis pigmentosa by application of X-rays to the midbrain. He also noted that a few years ago Dr. Ken Imachi, of Hyogo University, exposed the carotid body and applied X-rays to it to enlarge the narrowed field of vision and increase visual acuity. Both Dr. Nakamura and Dr. Masakichi Mikuni, of Niigata University, have since reported on the favorable results of this treatment.

#### NORTHERN IRELAND

**Health Service Eye Care** — Approximately 700,000 pairs of eyeglasses have been supplied to residents of Northern Ireland through the Supplementary Eye Services of the Health Services Act since its inception on July 5, 1948. The *Sixth Annual Report of the Northern Ireland Hospitals Authority* notes that when partial charges to patients were begun in May of 1951 the demand for eye services immediately dropped by about 50 per cent. There was a gradual increase during the next two-and-one-half years, however, until by the end of 1953 the demand was almost equal to what it had been in 1950. During 1953, the last year for which statistics were presented, 107,126 eye examinations were performed. Glasses were prescribed in more than 90 per cent of the cases. About three-quarters of the applications received during this year came from people who had already received at least one pair of glasses through the Eye Services since July of 1948.

#### PERU

**Orthoptic Service Established** — The first orthoptic service to be established on the west coast of South America has been opened as part of the ophthalmology department of the Arzobispo Loayza Hospital in Lima, Peru, according to the *A.M.A. Journal* of December 18, 1954. This new service is outfitted with the most modern equipment available.

Two hundred and seventy-one persons with muscle imbalance, either latent or manifest, have been treated thus far. Ninety-five per cent of those with normal retinas and 63 per cent with abnormal retinas have been corrected. The therapeutic procedures employed by the orthoptic method are aided by surgical intervention whenever indicated.

#### SWITZERLAND

**Causes of Non-Congenital Blindness** — A survey carried out at the Zurich Ophthalmological Clinic to determine the causes of the noncongenital blindness cases seen there appears in the *Journal d'Ophthalmologie Sociale* of July, 1954. This investigation covered all patients hospitalized at the clinic between January 1, 1945 and June 30, 1953, with the exception of those who came from outside the country. The latter were excluded in order to keep the causes relative for Switzerland.

In a total of 6,000 patients seen during this eight and one-half year period, 122 were considered hopelessly blind from non-congenital causes. The principal cause was glaucoma, which accounted for 18 per cent of the cases, while another 14 per cent resulted from detachment of the retina. Next in order of frequency were those due to chronic uveitis, 13 per cent; in-

juries, 12 per cent; arteriosclerosis, 10 per cent; diabetic retinopathy, 9 per cent; keratitis, 6 per cent; and cataract, 5 per cent. Infectious retinovascular diseases, atrophy of the optic nerve, tumors, myopic degeneration of the retina, and secondary glaucoma accounted for 13 per cent.

#### UNION OF SOUTH AFRICA

**Amplitudes of Accommodation**—A few years before the war a group of Cape-town optometrists doing research on dynamic retinoscopy found that the amplitudes of accommodation of most of their subjects were below what would be expected from Duane's tables. In search of further data on this subject Dr. W. Ralph Coates later decided to investigate all suitable cases which passed through his own consulting rooms, under standard conditions of lighting and target size. His findings were classified under "European South Africans," "Colored South Africans," "South African Natives," and "South African Indians."

Coates showed that the curve for South African Europeans was consistently lower than those recorded for Europeans by Donders and for North Americans by Duane. The individual plots for natives (Bantu), Indians and colored people closely followed the curve obtained for South African Europeans. Subsequent to the beginning of Coates' research an ophthalmologist in Panama reported that inhabitants of that country had subnormal amplitudes, with the lowest of these apparently found among people having the lowest standards of living. In 1950 Dr. Victor C. Rambo, of Velhore, India, also stated in a paper presented at the International Congress of Ophthalmology that the accepted tables of

accommodation did not seem to be valid for India.

In a report on this subject in *The Optician* of October 15, 1954, Coates suggested several possible reasons for these variations in amplitude in different countries: intensity of sunlight, race, and diet.

Coates concluded that if there are these differences in amplitude in different parts of the globe, then Duane's tables cannot be valid for all countries and new tables of accommodation amplitudes are needed for different countries with tropical, sub-tropical and temperate climates.

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#### NEW YORK LIGHTHOUSE AND OPHTHALMOLOGICAL FOUNDATION MEETING HEARS RESEARCH REPORTS

On February 24, 1955, directors and friends of the New York Lighthouse and the Ophthalmological Foundation heard reports of research activities being assisted by those agencies. Dr. Bernard Goldberg of the New York Eye and Ear Infirmary told of studies on rats of factors related to the causation of retrolental fibroplasia. Preliminary results showed that the high estrogen titer in the blood stream in the mother, in the last weeks of pregnancy, and the fact that the liver of the premature baby is not sufficiently well developed to inactivate the estrogen might be related to eye changes which Dr. Goldberg produced in rats.

Dr. M. V. Mody, working with Dr. F. R. Bussey at the Kings Park Hospital on Long Island, has made tonometric examinations on 3,587 mental patients. Up to the time of the meeting 434, or 12 per cent, were found with tensions higher than 27 millimeters of mercury on the Schiøtz tonometer. Dorsacaine 0.4 per cent was used as the anesthetic. The tonometers were sterilized by the use of a 1-to-1,000 solution of zephiran, and then the zephiran was washed off with distilled water. The survey is continuing.

## CURRENT ARTICLES

**The Etiology of Myopia.** K. Lindner. *Bulletin of the Ophthalmological Society of Egypt*. Vol. XLVI, Part 2. p. 520. 1953.

The author cites many observations which he feels contradict Steiger's explanation of myopia as a hereditary overgrowth of the eyeball, and sets forth the following conclusions of his own:

The myopic process must be caused by a softening of the posterior segment of the sclera, which is intensified towards the macular region, so that the eye distends under normal or even subnormal pressure through the walls of the arterial part of the capillaries into the tissue. The used fluids are absorbed by the colloid osmotic difference between the blood in the venous part of the capillaries and the fluid in the tissue, which is free from albumen. Normally there is no blood serum in the tissue spaces.

However, in cases of abnormal metabolism which may be due to hemostasis, inflammation, or the influence of poisonous substances, the permeability of the capillaries is increased and blood serum pours into the tissue. This blood serum contains albumen, which cannot be absorbed by the venous capillaries, and therefore stays in the tissues until it is carried away by the lymphatics or taken up by the tissue cells. The presence of blood serum in these cells softens the connective tissue.

Since the choriocapillaris in the region of the macula is dense, while in the periphery the capillaries are further apart, the macular region suffers

more than the periphery in cases of abnormal metabolism. In addition, the periphery of the sclera is well protected by the suprachoroid, with this protection diminishing towards the macula as the lamellae of the suprachoroid become more sparse. Both facts explain why abnormal metabolism of choroid-retina affects the sclera more in the macular region than elsewhere and why the sclera becomes thinnest at that point.

Applying this theory to specific cases, the author attempts to explain the outstanding known clinical facts about myopia. These include the hereditary aspect, the prevalence or absence of this condition in various professions, onset or increase during feverish diseases, "school myopia," and the relationship between myopia and severe keratitis in early childhood. In the latter case, for example, the author maintains that keratitis in the first years of life is accompanied by collateral inflammatory hyperaemia with resultant softening of the sclera, particularly in its least protected area, the macular region. Thus the keratitis is followed by myopia.

**Stability of Aqueous Solutions Commonly Employed in the Treatment of Primary Glaucoma.** W. H. Morrison. *American Journal of Ophthalmology*. Vol. 37, pp. 391, 557, 744. March, April, May, 1954.

An essential requirement of any aqueous solution used in the treatment of primary glaucoma is stability, since some patients may live a considerable distance from the nearest

skilled pharmacist and the solutions compounded for them may have to remain active for weeks or months. During this time they may also be subjected to extremely hot or cold temperatures. It is therefore important for the ophthalmologist to know how time and temperature influence the physiologic activity of solutions of any of the commonly employed miotics. Information on this subject in the literature has until now been very meager.

In the present study an attempt has been made to determine how long solutions of miotics, as commonly prescribed, retain their initial pH, tolerate marked temperature change, and maintain adequate physiologic activity. The drugs tested were pilocarpine hydrochloride, physostigmine sulfate, neostigmine bromide, methacholine chloride, and carbachol chloride.

The experimental procedure is described in detail. In general, it was found that aqueous solutions of these miotics remain stable for as long as six months, and that they are not affected by freezing or by heating to a temperature of 95 degrees for one hour.

**Management of Incipient Cataracts.** D. T. Atkinson. *The Eye, Ear, Nose & Throat Monthly*. Vol. 33, July 1954.

A brief outline is presented of questions arising in the management of maturing cataract patients for the guidance of the general practitioner, who often has to assume this responsibility, particularly in rural areas.

Symptoms which frequently perplex and alarm the patient are discussed, including double or distorted vision; burning sensation in the eyes,

possibly accompanied by pronounced inflammation of the lids; and the fact that some patients see poorly on bright days but comparatively well when the weather is cloudy.

The author advises against the artificial ripening of cataracts and states that if such an operation is contemplated the patient should be fully warned of the likelihood of developing secondary glaucoma. On the other hand, in cases of unripe cataract where both cataracts are of the same degree of maturity, he recommends operating on one eye instead of subjecting the patient to a long period of semi-blindness. The patient thus regains useful vision in a brief period, and the second eye may be operated on later, after the cataract has ripened sufficiently.

Circumstances under which the physician should advise against surgery because the patient is too poor a risk are also discussed. He recommends that in every instance, before operation is undertaken, every potential focus of infection should be eradicated.

The author emphasizes that the success of any type of operation for senile cataract depends to a great extent on the preparation of the patient for the procedure he must undergo, and states that the pain factor in particular should be explained to the point of removing all apprehension.

**Orbital and Transorbital Stab Wounds.** P. Kjer. *A.M.A. Archives of Ophthalmology*. Vol. 51, p. 811. June 1954.

It is not rare for orbital stab wounds to become fatal if no specific intervention is made, due to the common



occurrence of additional transorbital complications. This type of wound must be regarded as a serious and dangerous lesion, even though it appears to be superficial and is not primarily associated with signs of intracranial complications.

Such wounds may be divided into two types: those produced by blunt objects, penetrating the eye and possibly lacerating the eyelid; and those produced by long, slender, pointed objects such as pencils, twigs, pitchforks, etc. These may impinge on the eyeball but not damage it because it is pushed aside in the compressible fatty tissue of the orbit at the moment of injury. This paper is concerned with the latter type only. In these cases the entrance wound is usually inconspicuous; local symptoms may be mild with only transient visual disturbances or none at all, but with the possibility of intracranial complications which may at first be masked by the ocular symptoms.

Fifteen cases of orbital stab wounds are analyzed. The lesions were caused by various objects including twigs, pitchforks, a keyhole saw, and the point of a scythe. It is emphasized that patients who have sustained injury to the orbit should be hospitalized at once, since both orbital and cerebral symptoms may be slight or absent immediately after the trauma. Roentgenograms of the orbital region should be taken and the patient closely observed for intracranial complications while in the hospital. Blood pressure, pulse, respiration and temperature should be checked regularly, and the spinal fluid examined under certain circumstances. Special attention should be paid to neurological disorders such as loss of power, aphasia,

and mental clouding. The patient should be transferred to a neurosurgical hospital if signs of cerebral complications appear.

Every effort should be made to impress upon parents that children's playing with pitchforks or other pointed objects, shooting with bow and arrows, and fencing with toy swords involves a great risk of orbital stab wounds and their consequences.

### ***The Eyes of the Industrial Worker.***

R. W. Ryan and O. T. Mallery, Jr. *Industrial Medicine and Surgery*. Vol. 23, p. 243. June 1954.

During 1952-53 an ophthalmological survey was made of 53 metal fabricating and processing plants of 120 to 780 employees in the Detroit area. It was conducted by an ophthalmologist who previously had served as an industrial hygienist and thus was fully familiar with all the manufacturing operations encountered. Representatives of the bureaus of industrial hygiene of the Detroit Health Department and the Michigan Department of Health accompanied the ophthalmologist to all the plants. The industrial vision appraisal forms of the National Society for the Prevention of Blindness were utilized throughout the study, and were filled out by the ophthalmologist after the plant inspection and after appropriate interviews with medical and safety personnel. All inspections were made during work hours without prior notification.

Illumination was measured by a Weston light meter. Information was obtained from plant operators, superintendents and foremen in regard to chemicals, cleaning and processing baths, degreasing solvents and all

other potentially injurious substances. The following facts emerged:

Ocular foreign bodies, contusions and laceration injuries, burns, irritation, thermal and chemical and radiation injuries were found to be associated with operations of metal grinding, metal machining, etc., foundry and forging, welding, and handling of molten metals and other injurious substances.

Medical personnel consisted chiefly of physicians "on call" outside the plants, nurses in only one-fourth of the plants, and "trained" first aid attendants in most of them. Medical facilities consisted of first aid rooms in two-thirds of the plants; only first aid cabinets or kits in the other one-third. In 75 per cent of the plants eye examinations of job applicants were made by general physicians, who seldom tested for or discovered such diseases as chronic glaucoma. In most cases if any visual testing was done it covered only distance visual acuity; this despite the fact that the most important working distance for the majority of these employees was within arm's length. Since many were in the presbyopic age, near vision was often poor, but this was entirely ignored in the test.

Illumination appeared unsatisfactory in one-third of the plants; only two-fifths had had a check of illumination over most or all of the plant by an expert within a period of two years.

Engineering measures to reduce eye hazards were observed in most of the plants, and all had some type of safety program; but only two had full-time safety directors. Only four had "100 per cent eye protection" programs and only 10 offered any personalized fitting of safety glasses. Eight of these had

opticians fit glasses only, while the other two had ophthalmologists fit both plano and prescription safety glasses. One plant had no eye protection equipment at all.

During the year, 6,030 eye injuries had been treated, or approximately one for every two of the 13,757 production employees. This represented an average of 17 per cent of all injuries in the plants surveyed, although the ratio varied from three to 42 per cent in different types of plants. Two-fifths of those visited did not keep adequate records of injuries treated by their first aid departments, and less than half made any routine check of visual factors when investigating accidents.

**Diamox (Acetazoleamide) in Treatment of Glaucoma.** W. M. Grant and R. R. Trotter. *A.M.A. Archives of Ophthalmology*. Vol. 51, p. 735. June 1954.

The effect of Diamox was investigated in 40 patients, of whom eight were entirely normal and 32 had various types of glaucoma, involving 50 eyes. The dosage ranged from 125 to 500 mg. given orally every 12 hours, except in a few cases where a single injection of 250 to 500 mg. was given intravenously. This was done when acute glaucoma was accompanied by vomiting.

Frequent tonometric and occasional tonographic measurements were made, and all eyes were examined gonioscopically. The researchers' primary purpose was to compare the intraocular pressures before and after administration of Diamox, though they also watched for toxic effects.

On the basis of this investigation the value of Diamox seems most

definite as a supplement to the standard miotic drugs in the relief of acute angle-closure glaucoma. Given orally or intravenously, it is effective in lowering the intraocular pressure so that the pupil may constrict to open the angle and prepare the eye for iridectomy. In attacks of glaucoma secondary to iridocyclitis Diamox also appears to be helpful as a supplement to the standard medications.

In long-term treatment of chronic open-angle glaucoma, Diamox is still in a trial period. In most cases an initial lowering of intraocular pressure by about one-third is produced by administering 250 mg. two to four times a day. In some cases this effect has lasted for only a week or two, while in others it has lasted as long as two and a half months. The effect of Diamox is additive to that of the standard miotic drugs and epinephrine in chronic open-angle glaucoma, and it appears that systematic treatment with this drug should be regarded as a potential supplement to the standard topical medications.

In severe glaucoma due to peripheral anterior synechias and in hemorrhagic glaucoma, Diamox apparently produces only slightly helpful or transient lowering of the pressure, according to the experience of the authors thus far.

**Enzymatic Character of Respiration of the Lens.** J. Nordmann, P. Mandel, and D. Izraelewicz. *A.M.A. Archives of Ophthalmology*. Vol. 52, p. 42. July 1954.

Experiments were carried out with calf lenses, ten of which were boiled, to determine whether respiration of the lens is a nonenzymatic process as some researchers have claimed. The

principal argument for this claim has been the fact that normal oxygen consumption is maintained in spite of boiling the lens.

On the basis of the present study it appears that while the boiled lens does consume oxygen, the rate of consumption differs from that of the fresh lens, with the boiled lens consuming considerably more oxygen than the fresh one. In addition, this consumption occurs by different processes in the fresh and in the boiled lens. The point was made that this holds true for any tissue, such as the liver; yet no one would deny the enzymatic character of hepatic respiration.

The authors conclude that the oxygen consumption of the boiled lens represents simply the phenomenon of auto-oxidation, not enzymatic oxidation, and that this consumption depends on the denaturation of proteins. It cannot be compared with respiration in the fresh lens, which has characteristics distinguished by the consumption of glucose and the production of lactic acid.

**Relation of Tonography to Phasic Variations of Intraocular Pressure.** A. de Roeth, Jr. *A.M.A. Archives of Ophthalmology*. Vol. 51, p. 740. June 1954.

There are many reports in the literature concerning spontaneous diurnal changes in the intraocular pressure of both normal and glaucomatous eyes, but the reason for these changes is still somewhat obscure. The present study was undertaken with the idea that a correlation of Grant's aqueous outflow test with the diurnal intraocular pressure changes might reveal some new information on the mechanics of the

aqueous humor dynamics, thus furthering our understanding of the mechanism of primary glaucoma.

In control experiments on normal eyes it was found that during the course of a day there were only minor variations in the intraocular pressure and that the aqueous outflow remained approximately the same, staying well within the normal range.

Eyes with chronic simple wide-angle glaucoma which had not been operated on or treated and which had exhibited spontaneous or artificially induced diurnal variations in intraocular pressure did not show corresponding changes in the facility of aqueous outflow as measured by tonography.

In eyes with congestive narrow-angle glaucoma, on the other hand, the facility of aqueous outflow was related to the diurnal changes in intraocular pressure. The tonographic measurements in conjunction with the water-drinking test indicated that the intake of large quantities of water resulted in an increased flow of liquid into the anterior chamber, thus causing an increase in the rate of aqueous outflow.

It was felt that this experiment demonstrated the importance of tonography in the diagnosis of early cases of chronic simple wide-angle glaucoma.

**A New Trachoma Concept.** R. Ching. *A.M.A. Archives of Ophthalmology*. Vol. 51, p. 750. June 1954.

The pathology of simple trachoma is a quiet hyperplasia of the lymphatics of the conjunctival epithelium. It is not an inflammation; therefore trachoma is not a conjunctivitis and there is no acute phase. The primary lesion is a follicle, located specifically in the upper retrotarsal fold and the

epithelium of the upper cornea. Scarring and vascularization are reactions following this follicle.

The cause is a virus of which little is known. Many questions will have to remain unanswered until this virus can be isolated for study. The presence of the trachoma virus incites in the host tissue only a mild reaction, which may not always be detected. An equilibrium is established among the normal conjunctiva, the trachoma follicle, and its products. The shifting of this equilibrium is a characteristic of trachoma which is influenced by a number of factors which are not yet clear. The invasion of a secondary organism will cause a marked disturbance in the equilibrium—even to breaking it up and changing it into a different pathological product, to be called infected trachoma. On the other hand, less important factors will produce slighter shifting in one or the other direction.

The clinical criteria of trachoma diagnosis are the triad signs: follicle (30 per cent), pannus (40 per cent) and cicatrices (30 per cent). The author believes that at least two of the three (60–70 per cent) must be present for a case to be called trachoma. The criterion of cure is the breaking up of this triad to a point lower than 60 per cent.

The following classification of the disease is given: Simple trachoma, as described above, and infected trachoma, which is the type described in textbooks and seen in the clinics. These two differ distinctly from each other in etiology, pathology, symptoms, and treatment. The fact that this distinction has not been given adequate attention explains why there has been so much confusion in the trachoma literature of the past. A uni-

form, simple method of recording trachoma is proposed for the purpose of study, research, and practical use among international workers.

**Use of Parenteral Trypsin in Acute Inflammatory and Thrombotic Ocular Disturbances.** J. M. Hopen. *American Journal of Ophthalmology*. Vol. 38, Part 1. p. 84. July 1954.

Seventeen ocular cases refractory to cortisone were treated with parenteral trypsin during the course of acute inflammatory and thrombotic ocular processes. This drug initiates biochemical reactions which result in prompt and sustained subsidence of acute inflammation, while thrombolytic changes occur later. Satisfactory results were obtained in eleven of the cases treated, and the results in seven of these were most impressive. Trypsin was used subconjunctivally with one per cent pontocaine in two patients without any untoward ocular effects.

When more commonly used drugs appear to have no effect on the pathologic condition, trypsin seems to be an excellent adjuvant therapeutic agent. In addition, subconjunctival crystalline trypsin may have a definite clinical value in intraocular hemorrhage. It was felt that the results in these cases, in which there were no adverse reactions, should encourage further clinical studies.

**Office Routine in Ophthalmology.** F. J. Pinkerton. *Eye Digest*. Vol. 1, p. 3. August 1954.

In this article on office routine in ophthalmology the author endorses the practice of taking the tension by instrument of all patients in the presbyopic area or older, employing either a Schiøtz or an electric tonometer. He

states that he always does this prior to installing cycloplegic or midriatic drops for funduscopy in older patients. If the tension is at or above normal he repeats the tonometric measurement after the examination has been completed. If it is still high, or higher than before the drops were instilled, the tonometric measurement is repeated in the early morning of the following day. If the tension is found to be above the limits of normality on subsequent examinations the patient is considered to be a possible early glaucoma case and is followed up.

For proven early or late glaucoma cases the author uses special charts which he keeps in the room where the tensions are determined. These charts show a curve of tensions, treatment, dates of visual field measurements, etc., and offer a quick birds'-eye view of the whole problem in each case.

**Optometric Rehabilitation of the Partially Blind—A Report on 175 Cases.** E. Freeman. *American Journal of Optometry and Archives of American Academy of Optometry*. Vol. 31, p. 230. May 1954.

A new "high resolution" lens was tested on 175 patients who consulted the author in his private practice during the past year. It was concluded that this lens extends the range of assistance which can be offered to the partially blind, and that with it the specialist can help many people who have formerly been told that nothing could be done for them. This is especially true where higher magnifications are required for reading than can be obtained with telescopic spectacles and reading fitover aids. It is pointed out that many of these same people

could have been helped by earlier forms of microscopic spectacles or by high plus spectacle lenses, such as 16 or 20 D. lenses, but the newer lenses were definitely preferred by those patients who were offered a choice.

Thirty-two per cent of the total group who could be aided by the new lenses would not accept them. There were many reasons for this rejection, some of which were traceable to apathy or maladjustment of the patient—a fact which emphasizes the great need for further study of the basic psychological problems of the partially blind.

**The Dark-Room Test.** A. C. Higgitt. *British Journal of Ophthalmology*. Vol. 38, p. 242, April 1954.

Although it has been known for over 40 years that darkness can increase the intraocular pressure, there is still disagreement about how this occurs. Results of 400 dark-room tests are reported. The two-fold problem was to find out in what type of glaucoma the test would be of clinical value, and to study the mechanism of the rise of ocular tension.

Four determinations of tension were made in each eye: the first on the patient's arrival; the second a half hour later; the third after the patient had been sitting in a completely dark room (remaining awake) for an hour; and the fourth a half hour after the light was turned on.

In 117 normal eyes there was a tendency for the tension to rise, the mean increase being 2.1 mm. of mercury, with a range of  $-4$  to  $+9$  mm. In 91 eyes with chronic simple glaucoma the mean rise was also 2.1 mm. of mercury, but the range,  $-7$  to  $+14$  mm., was wider than in normal

eyes. The 122 eyes with congestive glaucoma behaved very differently. The mean change of tension was  $+16.2$  mm., with a range of 0 to  $+44$ .

The dark-room test is of clinical value only in cases of congestive glaucoma; it should not be considered positive unless the tension rises more than nine mm. Hg or reaches a level above 31 mm. Hg. Among 86 eyes with congestive glaucoma, in which the tensions were below 32 mm. Hg before the test, positive results were obtained in 67, more than 75 per cent. The response was found to be variable on repetition of the test.

Apparently two distinct mechanisms are involved in the response to the dark room test. In normal eyes, chronic simple glaucoma, and in cases of congestive glaucoma when using miotics, a neurovascular change is the likely explanation for the slight rise of tension. In congestive glaucoma without miotics there is little doubt that the dramatic changes in tension are brought about by pupillary dilatation accompanied by further narrowing of the already narrow angle, and consequently, occlusion of the chamber angle. The test is of value in assessing the control of tension by miotics which abolish the rise of tension in the dark.

**The Origin and Relationship Between Anterior Dialysis, Retinal Cysts, Retinal Folds and Retrolental Fibroplasia.** H. Weve. *Transactions of the Ophthalmological Society of Australia*. Vol. 13, p. 35. 1953.

An attempt is made to show the relationship between anterior dialysis and retinal cysts, between retinal folds and retrolental fibroplasia, and, finally, the relationship between these two



groups. The thesis is suggested that all the above conditions may be grouped together as degenerative processes and secondary organizations caused by abnormal oxygenation and nutrition in early youth, especially in those parts of the retina which are the latest to become vascularized.

It is also noted that other forms of eye affection may eventually be included in the same group. Among these might be special forms of detachment observed in the young, which are not localized at the ora serrata but between it and the equator, and in which small holes are found in a degenerated area.

**Prematurity and Blindness: The Relationship of Oxygen Therapy to Retrolental Fibroplasia.** L. E. Hoeck. *Postgraduate Medicine*. Vol. 16, p. 124. August 1954.

A brief review of retrolental fibroplasia as a cause of blindness in premature infants is presented and studies made at the District of Columbia General Hospital are described. At this hospital the constant appearance of retrolental fibroplasia in infants who received prolonged oxygen therapy and the striking experimental evidence of the damaging effect of oxygen on animal eyes led to the adoption of a plan in the premature nursery whereby oxygen was administered only according to strict indications. Since this policy of using oxygen sparingly was adopted in May, 1953, no new cases of RLF have appeared there.

Moreover, the mortality in the year after the new policy was adopted was 35 per cent, as compared with 41 and 45 per cent for the two preceding years. The author does not suggest

that mortality decreased due to restriction of oxygen, but only indicates that such restriction does not result in increased mortality. He concludes that if a policy of cautious and skillful administration of oxygen is followed, it is reasonable to expect that blindness from retrolental fibroplasia should become a rare occurrence.

**Visual Field Examination by a New Tachistoscopic Pattern Method: A Preliminary Report.** D. O. Harrington and M. Flocks. *Transactions of the American Ophthalmological Society*. Vol. 51, p. 413. 1953.

A description is given of a new method of qualitative visual field examination which can be used as part of a vision screening test or as a preliminary to more detailed perimetric study. It consists of the rapid presentation of abstract patterns in the field after the manner of the tachistoscopic training method used by the Air Force to teach airplane recognition, and may be both administered and interpreted by an unskilled technician.

There are nine patterns, each designed to detect a specific visual field defect. They are printed in white fluorescent sulfide ink on 14 x 18-inch white cards. The fixation point is a 5 mm. red dot. In ordinary illumination only this dot is visible, but when the card is exposed to the ultraviolet light of a black light tube the pattern appears as a series of luminous lines or dots against a purple background. Fixation is maintained on the red dot while the card is exposed to the black light for .2 or .3 seconds, and the patient then tells what he has seen. Patterns are easily described.

Each eye is tested separately with each card, but it is often advantageous to perform the test with both eyes open in order to elicit the extinction phenomenon binocularly. The cards are best exposed in a portable box with a chin rest mounted on the open lid so that the eye is 30 mm. from the fixation spot. The black light is mounted on the box lid under the patient's chin, and equipped with a shutter so that the exposure time may be easily controlled. It was not felt that a timing device was necessary, although this may be desirable in future experiments as a means of making the test a quantitative one.

This method of screening can be performed on large numbers of individuals by relatively untrained examiners. It should be of value in testing personnel in industry and applicants for drivers' licenses, and as part of the vision screening test in adult schools and in the armed forces. The authors feel that it is a useful adjunct to conventional perimetry, especially when used as a portable bedside examination of the visual field, and that it may also be of value as a research instrument in the study of the extinction phenomenon.

**Early Diagnosis of Chronic Simple Glaucoma.** H. C. Beckett. *Transactions of the Ophthalmological Society of Australia*. Vol. 13, p. 110. 1953.

Because early diagnosis is a major factor in reducing incidence of blindness from glaucoma the author stresses the importance of adopting a quick practical method of screening all patients over 40 years of age. He recommends the field of vision test as the best one for this purpose, stating that more early cases are detected by this

method than any other except the diurnal phasic variation test, which is impractical for mass screening. He recommends that the field of vision test be employed routinely for all patients over the age of 40.

Nineteen cases found by this method are reported. Eleven gave a history of pain or neuralgia affecting the ophthalmic division of the fifth nerve, a symptom which the author considers the most useful in arousing suspicion of early simple glaucoma. Two patients presented the symptoms of early presbyopia due apparently to ciliary muscle weakness, and two others complained of indefinite black spots in front of the eyes. Halos were noticed by only three patients. Six had none of the above symptoms and were seen by the ophthalmologist for routine refractions or obvious infection.

In all cases the earliest sign found by examination was in the temporal field of vision, the scotoma being inconstant and varying at each examination. Thus a nerve-fibre scotoma might be above the blind spot on one occasion and below it on another, while at the next examination a peripheral constriction or early baring of the blind spot might be the only lesion found. The author commented that this inconstancy is a favorable sign because it indicates that the scotomata are caused by spasm and that irreversible organic changes have not occurred. Such cases respond well to pilocarpine, which may check the glaucoma for months or years, or even indefinitely.

The discs were normal in the majority of cases, loss of pinkness being seen in only one patient who has since become gradually worse, requiring a filtering operation. The pupils in all

the cases were normal in size, but occasionally contracted somewhat sluggishly to light.

In all suspected cases the patients were hospitalized for the plotting of a two-hourly tension curve, which was found to be valuable. A variation of five mm. or more was taken to indicate the presence of glaucoma.

**Retinal Burns—New Hazard of the Atomic Bomb.** V. A. Byrnes, D. V. L. Brown, H. W. Rose and P. A. Cibis. *Journal of the American Medical Association*. Vol. 157, p. 21. January 1, 1955.

Preliminary results of an extensive Air Force research study of intraocular burns from an atomic bomb explosion are presented. In such cases the damage is caused by light rays—infrared, visible, and ultraviolet.

The primary site of the lesions produced by these rays is in the pigment layer of the retina and choroid, as demonstrated in experiments with rabbits having pigmented ocular fundi. In general the diameter of the lesion depends on the distance from the fireball, which, in its early phase, is roughly 100 times as bright as the sun. The pupillary diameter at the time of detonation is also very important and the danger is therefore greater at night.

The authors point out that pupillary and blink reflexes are too slow to prevent the lesion but are of some value in eliminating the added energy arriving after the first tenth of a second. The distances at which these burns may occur are much greater than those at which any other harmful effect of the atomic bomb occurs because of the focusing effect of the optical system of the eye. It was noted that night detonations at the Nevada

proving ground produced retinal burns in rabbits which were exposed at distances as great as 42.5 miles away.

**Slit-Lamp Studies on the Flow of Aqueous Humour.** T. H. Hodgson and R. K. MacDonald. *British Journal of Ophthalmology*. Vol. 38, p. 266. May 1954.

Fluorescein instilled into the conjunctival sac readily permeates the cornea and appears in the anterior chamber, where its concentration may be measured by means of a slit lamp. These facts have formed the basis for observing fluctuations in the rate of aqueous humour wherein fluorescein is utilized as a tracer substance. An improved method of measuring changes in the concentration of fluorescein in the anterior chamber without disrupting the physiological state of the human eye is described. Altogether 117 eyes, 32 of which were normal, were examined.

Fluorescein was instilled in the morning and the resulting concentration in the aqueous and the intraocular tension were recorded at frequent intervals throughout the day. The intra-ocular tensions were taken with a Schiøtz tonometer after a drop of 0.5 per cent pontocaine solution. After the concentration of fluorescein in the aqueous had been observed for about four hours a miotic was instilled and its effect on the concentration of fluorescein was observed. It was found that although a change in rate of bulk flow of aqueous humour is reflected in a change of flow in the aqueous veins, neither bears a constant parallel relationship to changes in tonometric readings. The authors feel that while the rate of escape of aqueous humour from the anterior chamber through its exit

channels is obviously important, the present findings indicate that it by no means explains all the changes found in tonometric readings. They conclude that a much broader concept must be envisioned, to include such factors as tone, changes in scleral rigidity, and rate of formation of aqueous humour.

**Outflow of Aqueous Humor.** J. Stepanik and R. A. Kemper. *A.M.A. Archives of Ophthalmology*. Vol. 51, No. 5. p. 671. May 1954.

The purpose of this study was to determine quantitatively to what extent the clear or almost clear aqueous veins participate in the transmission of aqueous.

By touching an aqueous vein upstream from its junction with a small blood vessel, a small group of blood cells can be produced in the aqueous vein and observed moving downstream at a velocity which can be determined. In this way an estimate was made of the aqueous outflow through the clear or almost clear aqueous veins in 30 normal eyes. This estimate was compared with the values of the total aqueous outflow determined by tonography. The visible outflow ranged from 6.51 to 69.02 per cent of the total, and it was assumed that another portion of the superficially outflowing aqueous was already mixed with blood and therefore could not be observed.

The author discusses in detail the dependence of values of the visible aqueous outflow on the anatomic relationships of the outflow pathways. Comparison of the values of the visible aqueous outflow with the coefficient of facility of outflow has shown that a higher visible aqueous outflow may be associated with a lower outflow resistance. However, the author believes

that the accuracy of measurement of both quantities must be improved before this can be said with certainty.

**Contact Lenses—An Evaluating Study.** J. L. McGraw and J. M. Enoch. *Transactions of the American Academy of Ophthalmology and Otolaryngology*. Vol. 58, p. 561. July-August 1954.

In an intensive study at the Army Medical Research Laboratory at Fort Knox, Kentucky, four types of contact lenses were compared with each other and with spectacles. Those studied were the conventional fluid lens, the Tuohy corneal lens, the Obrig lacrilens and the Dallos glass ventilated lens. The spectacles were standard Army issue lenses prescribed after cycloplegic refraction. Advantages and disadvantages, many of which are applicable to civilian use as well as to the military, were found both for contact lenses and for spectacles.

For the military, one of the foremost advantages of contact lenses is the fact that they are not affected by rain, snow or mud, nor is there any problem of frosting or steaming. They are more serviceable for use with sighting devices, gas masks, and various types of headwear which are not always completely adjustable to the needs of the spectacle wearer. They are far superior to spectacles for field activities and sports where the individual must undergo extreme physical activity because they are not as easily dislodged or broken, and offer extra protection to the eye as well. Their advantages for sports like swimming are also obvious.

Contact lenses may protect the eye from foreign bodies and direct trauma,

as well as offering varying degrees of protection against harmful radiation, and reflections from them cannot reveal hidden positions to the enemy. Furthermore the aberrations existing in high power lenses and the visual limitations created by spectacle frames do not exist in contact lenses.

The most outstanding disadvantages of these lenses at present are cost and the time and skill required for fitting. Another drawback is the necessity for accessory fluids. Although the new glass lenses are dependent only on natural tears, a wetting agent is required for plastic lenses. Maintenance of cleanliness and asepsis is also a problem.

Each of the lenses studied has individual merits and drawbacks, but the two which the authors consider best are the Dallos lens and the Obrig lacrilens. Their principal advantage is the absence of side effects which result in impairment of vision and discomfort, despite prolonged wearing time. Their main drawbacks are difficulty in fitting and the time required.

The fluid lens, relatively easy to fit, has a limited wearing time because corneal haze and halos develop. In addition special fluid is required. The Tuohy lens is fitted with relative ease but it has protracted adaptation time. Few of the subjects tested ever obtained comfort with it. It is also easily dislodged from the cornea and may be lost.

For general wear spectacles have many advantages over contact lenses. They are easily fitted and duplicated at relatively low cost, and there is only a short period of adaptation, with no limit to the wearing time. No solutions are required for their maintenance and wear. They do not aggravate the effect

of ocular irritants, nor produce photophobia.

In view of all the advantages and disadvantages of both spectacles and contact lenses, the authors felt that no blanket approval or disapproval of the latter could be made.

**A Preliminary Report of an Ophthalmic Survey on a Mass Population in Southern Rural Mississippi.** W. B. Clark, J. H. Allen, E. L. Leckert, Jr., R. F. Lorenzen and Y. L. Wang. *Transactions of the American Ophthalmological Society.* Vol. 51, p. 43. 1953.

A visual survey of a rural population was carried out in Mississippi during 1952 and 1953 under the supervision of the Department of Ophthalmology, Tulane University of Louisiana School of Medicine. It was financed by a grant from the W. K. Kellogg Foundation and was sponsored by the Mississippi and Louisiana State Boards of Health and the National Society for the Prevention of Blindness. At the time this preliminary report was presented the survey still had about a year to run. For that reason only the results obtained in one county are given, and these will be re-evaluated when the final report is made.

A mobile unit outfitted with the most modern ophthalmic equipment and visual testing apparatus operated in the rural areas of Marion County from February 17 until October 1, 1952. It carried a portable generator to supply current for operation of the ophthalmic instruments in remote areas where electric current was not available. The research team consisted of an ophthalmologist, a technician, a social worker, a secretary and a clerk. Their project was well publicized in

advance and had the full cooperation of the local ophthalmologists, with the result that about half the entire population of the county eventually presented themselves for free examination. Therapy was not part of the plan, but patients with defects were referred to their local physicians or to public health agencies. The follow-up on patients needing treatment was the responsibility of the local health officer and his personnel.

In this preliminary report the results are given for patients of known race, who numbered 8,199. Of these, 10.5 per cent were found to have some recognizable defect, not including presbyopia in patients over the age of 40. Since this is almost a uniform finding in persons beyond that age, those who presented no other abnormality were regarded as having normal vision.

Up to age 40 the proportion of females with visual defects was higher than the proportion of males, except that in white children under the age of 10 the proportions were almost identical. After age 40 the rates in both races and both sex groups increased, and the rate for males exceeded that for females. In the over-all totals the proportion for males slightly exceeded that for females. The percentage of defects was also found to be higher in the whites than in the Negroes—11.5 per cent compared to 8.9 per cent.

Even though presbyopia was not counted as a defect in persons over 40, it was found that errors of refraction accounted for more than half the total abnormalities identified. Motor anomalies accounted for another 14.6 per cent; diseases of the conjunctiva, 8.8 per cent; congenital anomalies, 6.2 per cent; diseases of the choroid and retina, 5.2 per cent; and diseases of the

lens, 4.6 per cent. Other major groups of defects accounted for less than two per cent each.

The observation that a major proportion of these visual defects can be handled medically suggested to the authors that the whole question of ophthalmic training should be reopened, and that possibly provision should be made for deletion of the surgical requirement for ophthalmologists who locate in rural areas.

**Oxygen Studies in Retrolental Fibroplasia. IV. Clinical and Experimental Observations.** A. Patz. *American Journal of Ophthalmology*. Vol. 38, p. 291. September 1954.

A controlled study was conducted in the premature nursery of the District of Columbia General Hospital from January 1, 1951 through May 1, 1953 to determine the role of oxygen in retrolental fibroplasia. The results established that the over-use of oxygen is an important factor in the production of this disease. Furthermore no significant difference in mortality rate was noted between infants in the high and the low oxygen groups.

Paralleling the nursery study experiments were performed to evaluate both the ocular and systemic effect of oxygen on several species of animals. In these experiments lesions analogous to early human retrolental fibroplasia were produced in several species of animals by exposing them to an enriched oxygen environment. Dr. Patz states that the following qualities of the oxygen-induced experimental lesions justify the conclusion that these lesions represent the same disease seen in humans:

Similar ophthalmoscopic changes progressing from a preliminary phase



of vaso-constriction through the typical clinical stages of early human disease; production of abnormal capillary proliferation in the retina with eruption of these vessels onto the vitreal surface of the retina and into the vitreous to form glomerular-like tufts as is characteristic of human disease; the same histochemical response to periodic-acid fuchsin stain of the experimental and human lesions; a general susceptibility of the animal eye to oxygen instead of an isolated species susceptibility, a uniform lesion indistinguishable microscopically from that in human cases being produced in four strikingly different species; the fact that the degree of response of the animal eye is directly related to the extent of vascularization in the retina, an observation which correlates with the pattern of susceptibility of the human retina to retrolental fibroplasia; and the fact that the experimental lesions produced by oxygen are limited exclusively to the eyes.

These data indicate that retinal vasoconstriction is probably fundamental in the development of retrolental fibroplasia. The observation of advanced retinal vasoconstriction may ultimately be considered as a preliminary stage of the disease.

Dr. Patz states that the clinical and experimental data justify the recommendation that oxygen therapy should be rigidly curtailed in the premature nursery and its over-use cautiously avoided. To insure this the following recommendations are made:

The medical and nursing staff should be thoroughly indoctrinated on the dangers of over-usage of oxygen; except for emergency use, oxygen therapy should require a specific order; every nursery should be equipped with

an oxygen analyzer; oxygen therapy should be ordered by concentrations rather than flow rate; oxygen concentrations should be measured and recorded at least once daily.

These studies were aided by grants from the National Institute of Neurological Diseases and Blindness of the Public Health Service, and the National Society for the Prevention of Blindness.

**The Therapeutic Possibilities of Carbon Dioxide in the Prevention of Retrolental Fibroplasia.** E.G. Fortier. *American Journal of Ophthalmology*. Vol. 38, p. 342. September 1954.

This paper discusses "the one important change in management of premature infants which has taken place during the period of recognition of retrolental fibroplasia," the administration of oxygen in high concentrations rather than in lower concentrations (and often in combination with five- or 10-per cent carbon dioxide) as had been the practice previously.

Although oxygen alone was the first therapeutic gas utilized in the treatment of premature infants (under circumstances which did not permit very high concentrations of the gas), an early modification involved the use of carbon dioxide in combination with the oxygen. Following the teachings of Yandell Henderson, mixtures of oxygen with either five- or 10-per cent carbon dioxide were administered via the unmodified Gordon-Armstrong or similar incubators. Despite the classical nature and once widespread acceptance of Henderson's work, however, pure oxygen again came to be practically the sole gas utilized, in higher and higher concentrations.

The author states that the oxygen-

carbon dioxide balance which is important in the regulation of vasomotor balance in prematurity has been ignored. He feels that the vasoconstrictive effects of high oxygen concentrations upon the premature retina may be explained by the predominance of local vascular stimulation in the determination of the vasomotor state in prematurity, the high plasma oxygen resulting in a relative plasma carbon dioxide deficit.

Not every premature infant requires, for the preservation of life, such high concentrations of oxygen as have been utilized in recent years. For those premature infants whose existence does appear to depend upon such therapy, investigation of the addition of carbon dioxide to the oxygen in non-toxic proportions is suggested.

**Strong Reading Additions for Subnormal Vision.** G. Fonda. *American Journal of Ophthalmology*. Vol. 38, p. 362. September 1954.

The author states that in the English literature only occasional reference is made to the use of reading additions as high as +6 D. (1.2) and these are prescribed for one eye only, there being no description of reading additions of +5 D. to +10 D. for binocular use, particularly in bifocals, in patients with subnormal vision. He maintains that according to his experience more patients with subnormal vision (ranging from 3/200 to 20/40) can be treated successfully by the use of such additions than by any other appliance. Estimating that more than 50 per cent of all patients with subnormal vision can be helped by these additions, he recommends that the additions be used before telescopic spectacles in the examination of such

patients. In his own practice monocular reading additions as strong as +14 D. have been successfully prescribed in the form of reading glasses.

Dr. Fonda reports that although many ophthalmologists advise against the use of reading additions over +3 D. for binocular use because of the strain on convergence, he has prescribed additions as high as +9 D. for binocular reading glasses which have proved satisfactory. He has found bifocals with strong reading additions generally more practical than near-vision glasses. One piece bifocals have proved most desirable.

A method of determining interpupillary distance for reading is presented, as well as two case reports.

**Cicatricial Stage of Retrolental Fibroplasia.** A. B. Reese and J. Stepanik. *American Journal of Ophthalmology*. Vol. 38, p. 308. September 1954.

To help complete the clinical picture of retrolental fibroplasia an analysis is presented of 672 cases examined in the inactive cicatricial or end-stage of the disease. Of these 352 were male and 320 female. They do not represent consecutive cases followed from birth but patients referred for opinion after or near the end of the active phase. The following conclusions were drawn:

Retrolental fibroplasia may occur in infants with normal birth weight. It may also be unilateral. The glaucoma which may complicate the disease is transitory (three months to a year) without treatment. Ciliary processes are constantly seen in Grade V disease around the periphery of the retrolental tissue. Cataractous changes play an inconspicuous part.

Some degree of enophthalmos is usually noted in Grade V. The location of the fundus lesion in the partial cases (Grades I to III) is on the temporal side in 90 per cent of the eyes. A pigment conus at the disc margin is constantly seen on the side opposite to the side of the fundus affected, that is on the nasal side in 90 per cent of the eyes. Holes or rarefied areas may appear in the retina over the detached areas in Grades I to III.

The vision in Grade I disease is 10/20 to 20/70; in Grade II disease 20/70 to 10/70; and in Grade III disease 10/70 to 3/200. The refractive error is usually from four to eight diopters of myopia. Further loss of vision may rarely occur late as a result of cataract or further detachment of the retina secondary to hole formation.

**Preventive Program for Retrolental Fibroplasia in Arkansas.** J. W. Eliot. *Journal of the Arkansas Medical Society*. Vol. 51, p. 140. November 1954.

Quite aside from the human values involved, it costs Arkansas \$10,000 more to educate a blind child than a seeing one.

With a view to reducing the incidence of blindness due to retrolental fibroplasia the maternal and child health division of the State Board of Health and the pediatrics department of the University of Arkansas studied the oxygen concentrations of incubators in 24 hospitals in various parts of the state.

With vents open, in the Gordon-Armstrong standard incubator, oxygen concentrations were found to vary from 27 to 56 per cent at an oxygen

flow of two liters per minute; with vents closed, from 33 to 58 per cent with the same flow. In the Isolette type of incubator, with vents open at two liters of oxygen per minute, concentrations varied from 33 to 48 per cent; with vents closed concentrations went to 71 per cent at this rate of flow, and to 90 per cent with 6 liters per minute. Detailed data are given for the flow rates and for concentrations obtained with a vapojet. Under the same circumstances in the same incubator the concentration obtained varied depending on whether the oxygen tank was nearly full or empty.

As a result of this study hospitals are urged to obtain an oxygen analyzer, to train personnel on all hospital shifts to use it, to have physicians' orders specify oxygen therapy in terms of concentration rather than liters per minute, to establish routine examinations of ocular fundi of small premature babies during and after their hospital stay.

**Corneal Transplantation: A Review of 365 Operations.** R. T. Paton. *Transactions of the American Ophthalmological Society*. Vol. 51, p. 581. 1953.

The results of 365 corneal grafts performed at the Manhattan Eye, Ear and Throat Hospital, all but 18 of them by the author, are analyzed statistically. A follow-up period of two months was taken as the minimum in computing the operative results, although in the majority of cases the patients had been followed up for a much longer period.

The 365 operations were performed on 330 eyes, two successive grafts having been done on the same eye in

25 instances and three grafts in five instances. In case of multiple operations on the same eye the clarity of only the last graft was counted for the computation of operative results, except in a special tabulation of lamellar grafts. In 13 cases the graft was clear on discharge but there was no follow-up, while 18 others were followed for less than two months.

Of the remaining 299 cases, 193, or 64.5 per cent, remained clear; 106, or 35.5 per cent, clouded. The percentage of clear grafts in the various diagnostic groups were tabulated as follows: keratoconus, 89.3; Groenouw's dystrophy, 85.7; nonspecific scarring, 68.8; scarring from inactive ulcer, 66.7; interstitial keratitis, 62.2; leukoma, 55.6; active ulcer, 50; trachomatous scarring, 45.5; chemical burns, explosion injuries and traumatic wounds, 39.1; adherent leukoma, 35.3; Fuch's dystrophy, 30.8.

The visual result was tabulated in 222 of the 299 eyes in which the graft was followed for two months or longer. One hundred and sixty of these, or 72.1 per cent, showed visual improvement. Forty-six, or 20.7 per cent, had the same vision as before operation, and 13, or 5.9 per cent, had a reduction in vision. There were three enucleations within one and a half years after the keratoplasty and two others four years postoperatively.

#### **Electroretinogram in Nyctalopia.**

J. C. Armington and G. J. Schwab. *A.M.A. Archives of Ophthalmology*. Vol. 52, p. 725. November 1954.

The authors note that the presence of distinct defects in the electroretinogram in the varying forms of night blindness has been well documented in recent reports. The most conspicuous

changes have been recorded from frank cases of primary pigmentary degeneration of the retina. In these cases the tracings are usually extinguished or greatly reduced in amplitude.

In this report electroretinograms are described for patients manifesting several kinds of night blindness, but special attention has been given to subjects with congenital night blindness without fundus change. Both electrical and psychophysical measures were made.

The electroretinograms from patients with retinitis pigmentosa were of the typical subnormal and extinguished variety. Those from the congenitally night-blind without fundus pathology exhibited only photopic components. Further, the tracings suggest that this type may exist in two forms. Electroretinograms obtained from myopes with complaints of defective night vision were found to be within normal limits.

**Erythromycin in Trachoma.** L. P. Agarwal and R. P. Saxena. *British Journal of Ophthalmology*. Vol. 38, p. 690. November 1954.

An experiment to determine the effectiveness of the new antibiotic, erythromycin, in the treatment of trachoma is reported. One hundred patients with trachoma in the infiltrative or follicular stage, in which inclusion bodies could be seen, were selected for this study. Conjunctival scrapings from the upper fornix were obtained and examined.

Fifty of the cases were used as controls and received no treatment except normal saline drops. The remaining fifty were treated with erythromycin, receiving 100 mg. tablets every four

hours for a week, in addition to local application of ointment (5 mg./g. concentration) two to three times a day. A search for inclusion bodies was made in stained slides of conjunctival scrapings every two weeks and the treatment was continued in several cases even after the inclusion bodies were absent from the smears. Final assessment was made at the end of six weeks.

In all untreated cases inclusion bodies were present in all four specimens of tissue scrapings, confirming the authors' previous finding that inclusion bodies do not disappear without treatment. Subjective symptoms did not improve.

In the treated cases subjective symptoms began improving within 24 hours and disappeared within three days. The pannus retrogressed in 50 per cent of the cases; the inclusion bodies disappeared. In three cases local application of ointment caused heaviness or swelling of the lids, or conjunctival congestion. In only one case out of 50 was a gastro-intestinal reaction, in the form of a mild diarrhea observed.

#### **Allergy as a Cause of Glaucoma.**

R. D. Wiseman and D. E. Moore. *The Journal of Allergy*. Vol. 25, p. 355. July 1954.

The role of allergy as a possible cause of glaucoma is discussed and a case of simple, recurrent, congestive glaucoma apparently due to allergy is presented.

Over a period of seven years the patient had had recurrent pain in and around the left eye, usually coming on about two hours after meals, but his vision was not affected. During these attacks the eye would tear and become red. The patient also complained

of being bloated with gas before the eye symptoms developed. In the month preceding his initial visit to the authors his attacks had grown more frequent, eventually becoming refractory to miotics and recurring daily. During this period he had also had an increased amount of gastrointestinal distress. His ophthalmologist believed the two conditions might be connected and referred him to the authors for allergy tests.

Since the patient appeared to have none of the common allergies he was advised to keep a food diary to check food sensitivity. From this it was discovered that his trouble came after eating peaches, mayonnaise and green peas. He was then put on an elimination diet which included the avoidance not only of these foods but also of beans, nuts, mustard, oranges and pitted fruits such as peaches, plums, apricots and cherries, since these foods are all members of the legume family and are closely related antigenically. The patient began to feel better almost immediately and his attacks of ophthalmic pain and gastrointestinal disturbance disappeared. When seen one month later he commented that he felt better than he had in years. He continued to feel exceptionally well for more than eight months, until one day he drank a glass of orange juice and shortly thereafter noticed discomfort both in his eyes and in the gastrointestinal tract. At a later date he tried eating peas and again was most uncomfortable. On each occasion all symptoms subsided as soon as he went back to his elimination diet. In view of this the authors feel that either oranges or any member of the legume family could produce a flare-up of his glaucoma and gastrointestinal distress.

## BOOKS AND PAMPHLETS

**Clinical Manual on Aniseikonia.** R. E. Bannon. American Optical Company, Buffalo, N. Y. 1954. 120 p. \$1.00.

This little monograph has evolved from a series of lectures given by Robert E. Bannon on the clinical aspects of the measurement and correction of aniseikonia and is written specifically for clinicians. (Aniseikonia is that anomaly of binocular vision in which there exists a difference in magnification of the images in the two eyes.) Bannon, who was formerly a member of the staff of the Dartmouth Eye Institute, is very well qualified to discuss these matters, and his monograph fills a very definite need. The types of instruments that have been made and can be used to measure aniseikonia are first described, emphasis being placed on the latest model of the eikonometer, for which explicit directions regarding use are given. Then the clinical problems of evaluating the measurements and of determining when to prescribe aniseikonic corrections, especially in connection with asthenopic symptoms given by the patient, are gone into. A number of illustrative cases are described. These are then followed by a discussion of isekonic ophthalmic lenses in general and of the problems involved. A generous bibliography is appended. The book is heartily recommended to those interested in the practical clinical aspects of aniseikonia, and is a must to

those clinicians having eikonometers or those contemplating the purchase of eikonometers for their offices.

KENNETH N. OGLE, PH.D.

**Year Book of Eye, Ear, Nose and Throat. 1953-54 Series.** Edited by Derrick Vail, M.D., and John R. Lindsay, M.D. The Year Book Publishers, Chicago. 458 p. \$6.00.

This text, one of the 13 comprising the Practical Medicine Series of Year Books, includes articles abstracted from journals received between October 1952 and September 1953. In the section on *The Eye* edited by Dr. Vail, the abstracts and editorial comments appear under the headings: orbit and adnexa, conjunctiva and cornea, uvea, lens and cataract, refraction and motility, optic nerve, neurology and visual fields, retina, glaucoma, surgery and therapy.

Dr. Lindsay is the editor of the second half of the book dealing with *The Ear and The Nose and Throat*. This series is designed to keep physicians informed of significant world-wide advances in their respective fields.

**Healthier Living.** Justus J. Schifferes, Ph.D. John Wiley & Sons, Inc., New York. 1954. 928 p. \$5.75.

In view of all the textbooks that are available for the teaching of personal and community health in colleges one would not anticipate that a new text would be necessary. The author of



this book, however, has such an enthusiasm for healthful living and draws on such a broad literary background in the fields of history, anthropology, sociology, psychology and child development that he has prepared a most lively and useful work.

A chapter of 19 pages covers vision, eye structure, common visual defects, use of the eyes, and prevention of blindness. The chapters on the doctor-patient relationship and on medical information and misinformation, explaining the folly of self-medication and discussing quacks, cults and fads, are most helpful.

The illustrations and topography are excellent.

**State Certification Requirements for Teachers of Exceptional Children.** U. S. Department of Health, Education, and Welfare. Office of Education. Bulletin 1954, No. 1. Romaine P. Mackie and Lloyd M. Dunn. U. S. Government Printing Office. Washington, D. C. 60 p. 25 cents.

This national overview of state certification requirements for teachers of exceptional children was prepared as part of a study on "Qualification and Preparation of Teachers of Exceptional Children." Confined in general to a reporting of status information, it includes opinions of some special education personnel on certain aspects of state requirements for professional preparation.

Next to speech correction, the areas in which the largest number of states have special teacher standards are, in order, the hard-of-hearing, the crippled, the mentally retarded and the partially seeing. A number of states which do not issue special credentials require local school systems to employ

teachers with specialized preparation satisfactory to the state department of education, before special assistance is granted. Many local school systems require even higher standards than those set by the states.

Private agencies, it is emphasized, have helped to elevate standards. One of the important functions of these organizations is to see that children are protected by having well-qualified teachers. There is a trend for such agencies, along with local school systems and teacher education institutions, to cooperate with state education departments in developing requirements.

Teachers of the partially seeing are certified by almost twice as many state departments of education as are teachers of the blind, reflecting the fact that there are almost 10 times as many partially seeing children of school age as there are blind children. Furthermore the former are usually educated in local school systems, while as many as 75 per cent of blind children are currently enrolled in residential schools.

Sixteen states report that they have special certification of teachers of the partially seeing; five states have joint special certification of teachers of blind and partially seeing.

**History of Ohio Sight Saving Classes. 40th Anniversary, 1913-1953.** Genevieve M. Givins and Lucile M. Fralick. The Ohio Association of Sight Saving Class Teachers. 1954. 88 p.

Teachers of the partially seeing, in fact anyone concerned with the problems of the exceptional child, will find inspiration and encouragement in this unique report. Forty years afford the opportunity of evaluating a program, of noting successes and failures. Ohio

teachers now in the work through the state, including some of the real pioneers, have contributed to this history. In her introduction Miss Givins of Toledo observes that if it has a personal tone it is because it has been written by those to whom the subject is a prime interest—who could not be expected to be entirely objective about a cause so vitally a part of their lives.

Dedicated to Robert B. Irwin who established the first Ohio sight saving class in Cleveland in 1913, the report traces the pioneer work of that period on through the developmental stages, the changes in methods, materials, procedures, administration and supervision. The selection of teachers and their special training are discussed. Individual class histories from 41 Ohio communities are included.

Ohio was the first state to establish the cooperative plan of educating visually handicapped pupils with those of normal vision, and the first to provide large-type books for the partially seeing. The state was among the first, if not the first, to make a state appropriation for the education of the partially seeing; plan and conduct college courses for the training of sight saving class teachers; appoint a director of special education in the department of education; provide trained supervisors for sight saving classes; publish booklets on the education of the partially seeing; and secure the cooperation of illuminating engineers on research in proper lighting of classrooms for these pupils.

Organized in 1929, the Ohio Association of Sight Saving Class Teachers holds an annual meeting and makes possible interchange of information throughout the year.

Tribute is paid to the late Winifred Hathaway, former associate director of the National Society for the Prevention of Blindness, for her help and encouragement.

"Her educational background," the report continues, "combined with her interest in problems of vision made her invaluable in helping to solve problems that arose in this new field. She studied methods of teaching, supplies and materials, schoolroom and home lighting, as she traveled throughout the United States and Europe, and learning as she went, she taught as she went, thereby giving the value of her experience to state after state. Because she knew how necessary it was that teachers of these classes should have an understanding of eye conditions as well as an opportunity to discuss special methods of teaching, she became interested in promoting teacher training courses. Nearly all of Ohio's sight saving class teachers have had the opportunity to sit in Mrs. Hathaway's classes and learn from her wisdom. Nor was her role limited to that of teacher. She was never too busy nor tired to share the troubles of a student and guide each one to better ways. Ohio's teachers are proud to honor her as their leader and lift their heads high as they call her 'Friend.' Mrs. Hathaway must be especially honored among the effectively contributing pioneers."

**Codigo de la Ceguera. (A Codification of Blindness.)** Tomas R. Yanes, M.D. Editorial Echevarria. Fomento No. 114, Luyano, Habana. 1954. 264 p.

The activities of the League for the Prevention of Blindness of Cuba, founded by Dr. Yanes, are described in this publication. Specifically dealt with are the problems of blindness

prevention and social assistance for the blind. Dr. Yanes, a consultant of the National Society for the Prevention of Blindness, emphasizes the value of such an organized effort under official auspices and urges other countries to follow the example of Cuba in sponsoring the League.

**A Survey of College Health Programs for Prospective Teachers; with Special Reference to Eye Health.** Marjorie A. C. Young. National Society for the Prevention of Blindness, New York. Pub. 242. 134 p. \$1.00.

In the fall of 1948 representatives of the National Society for the Prevention of Blindness met with members of the Studies and Standards Committee of the American Association of Colleges for Teacher Education to consider an overall long-range plan for the development of functional integrated programs of eye health and safety for teacher education institutions. This report sets forth the major steps in the development of the plan to date. It is based on a fact-finding survey of 40 colleges approved by the Association. More than 50,000 full-time undergraduate students were enrolled annually as education majors in these institutions during the survey period—the school years 1949–50 and 1950–51.

Quality and quantity of health services and the type of physical examinations were found to vary considerably. In only seven of the colleges visited were any tabulations available on the number of students with various physical defects. It was therefore not possible to discover the number and kind of visual difficulties, nor the changes in visual status during college life. Much of the vision testing was substandard.

Follow-up health counseling was a weak aspect of the health program in general, and there was little interchange of essential information on student health problems between various members of the health service staff and instructional and counseling personnel.

Prospective teachers majoring in elementary education had more and better curricular experiences in the health area than did majors in secondary education.

A study of student environments disclosed significant facts regarding illumination of classrooms, laboratories, libraries, shops, dormitories and other areas. Although 30 footcandles of illumination is recommended for ordinary classrooms, in almost half of those studied it was not possible to obtain levels as high as 10 on all working surfaces, even by using all available daylight and electric light. In many libraries footcandle levels were low and such adverse factors as glare were prevalent.

In the shop areas (19 colleges) lighting conditions were no better. Little attention was paid to eye protection. For example, in four colleges no eye shields were mounted on grinders, no goggles were in evidence near the grinders and neither students nor instructors wore them. Where eye shields were mounted on grinders, in almost every case they were so badly soiled, cracked and scratched that it was impossible to get a clear view of the work point. Hence in many shops the shields had been raised out of position. The observer did not see a single shop instructor wearing goggles in lathing and grinding areas. It is concluded that teacher training institutions will need to develop safety

programs consonant with those in industry if industrial arts teachers are to be properly prepared.

Miss Young, former education consultant of the National Society, makes it clear that emphasis on such deficiencies in specialized areas does mean that comparable deficiencies exist in other areas in the teacher education program. In more than 1,000 conferences with faculty members and administrative staffs she was impressed by their wholehearted desire to upgrade practices and standards.

The report includes a survey form, illumination checklist, diagrams of typical areas and other material that can be utilized by college administrators who are interested in evaluating their own health programs.

**Screening School Children for Visual Defects.** Marian M. Crane, M.D.; Franklin M. Foote, M.D.; Richard G. Scobee, M.D.; and Earl L. Green, Ph.D.; with statistical assistance of Bronson Price, Ph.D. Children's Bureau Pub. 345. U. S. Government Printing Office, Washington 25, D. C. 1954. 35 cents.

This is the complete report of the study conducted in St. Louis, Missouri, starting in 1948 in which the National Society for the Prevention of Blindness participated. A preliminary report appeared in the Fall 1952 issue of *SIGHT-SAVING REVIEW*.

Six hundred and nine sixth-grade students and 606 first-grade students in the public schools were given a thorough ophthalmological examination and tested with certain commonly used vision screening procedures. The report deals with the subjects, methods and findings of the study and includes a discussion of such factors as im-

proving test construction and more effective use of present tests.

Of all the procedures evaluated the simple Snellen test for distance acuity and the Massachusetts Vision Test gave the highest correlations with the ophthalmological examination. With the binocular testing instruments 50 to 71 per cent of the students were referred, an unmanageably high proportion for most schools. Teachers were apparently able to administer the Snellen test about as efficiently as the technician and nurses.

"There are recognized methods of increasing the reliability of testing procedures," the report states, "but these require devotion of more time to administration of the tests than is customarily allowed in screening programs. Hope that, even with the most ingenious instrument devisable, any visual function can be measured reliably by a quick check holds practically no promise of success, especially with children."

It is concluded that "if facilities for follow-up of referrals are too limited to reach more students than will be referred by the Snellen test (or other test of visual acuity at far point), there is probably nothing to be gained by using a screening procedure with a higher referral rate. Where there are more adequate follow-up facilities, one of the multiple-test procedures may be preferred in order to find more of the students who need care; as now set up the Massachusetts Vision Test is the most efficient of these, but all could be made more efficient by following the suggested modifications. It is unlikely that anything is to be gained by using procedures other than the Snellen, or possibly the Massachusetts Vision Test, below third or fourth grade."